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TWENTY *years ago the Marine Research Society published* The Making of a Sailor or Sea Life Aboard a Yankee Square-Rigger, *by Frederick Pease Harlow, a sailor on the ship* Akbar *of Boston in the eighteen seventies. Mr. Harlow, who is now living in Seattle, Washington, has kept a lively and accurate recollection of the details of his service at sea more than seventy years ago, and of the chanties that were sung on board ship in his day. These he has assembled in a manuscript entitled* Chanteying Aboard American Ships, *but, in advance of its publication in book form, Mr. Harlow has allowed* THE AMERICAN NEPTUNE *to print certain parts serially. The first chapter appears in the present issue.*

It is needless to remind the reader that in a few years we shall no longer be able to obtain first-hand information concerning American square-riggers from the memories of living men and women. Consequently anything that can be recorded now *has a singular value for the future, which will be forced to rely upon the archaeology of the closet scholar. Many readers of the* NEPTUNE *treasure Miss Joanna C. Colcord's* Songs of American Sailormen, *which is also based upon personal*

knowledge of life at sea. Mr. Harlow's collection contains a number of chanties not published by Miss Colcord, as well as variant music and additional verses for others that she has already printed. THE AMERICAN NEPTUNE *is happy to have the opportunity to print Mr. Harlow's versions of these chanties, and hopes that their publication may induce other sailors with long memories to contribute similar records of their years at sea.*

An arrangement has been made with Alfred Smith and Company, 338 South Camac Street, Philadelphia, Pennsylvania, to bind volumes of THE AMERICAN NEPTUNE *in standard blue buckram. The charge will be $2.50 per volume. As far as possible to avoid delay, it is suggested that subscribers who wish to have volumes bound should immediately notify Alfred Smith and Company of their intention, enclosing a self-addressed postcard, which will be mailed by the bindery when the shipment of the volumes is desired. In this way subscribers will have the use of their issues until the bindery is ready to begin work. Although the Editors have made this arrangement for the convenience of subscribers who wish to maintain the uniform appearance of their sets of the* NEPTUNE, *all transactions concerning binding must be arranged directly between the subscriber and the bindery. The American Neptune, Incorporated, assumes no responsibility, and the Editors cannot enter into correspondence concerning binding.*

Chanteying Aboard American Ships

BY FREDERICK PEASE HARLOW

When manning the windlass,
  Or setting the sails,
To rouse home the fore sheet
  In stiff blowing gales,
You chantey and sing with
  A chorus so strong,
That one man's worth four
  As the ship bowles along.

A CHANTEY (pronounced shanty) is a song sung by sailors aboard ship while doing various kinds of manual work of a heavy nature. This, to the landsman, may seem ridiculous, but, notwithstanding, the right song at the right time with sailors accomplished what otherwise could not have been done.

Chanties were principally used in the merchant service, and seldom, if ever were heard in the navy. The word is probably taken from the French *chanter*, to sing. It is a combination of chant and song, i.e., the chanteyman led off with a solo, for a line or two, when it was taken up by the crew in chorus. So common were the chanties in the 1870's, that they were sung on all square-riggers, even in brigs and topsail schooners, and instead of confining themselves to the old set verses and words, the sailors were privileged to sing any words that would rhyme. Consequently the riff-raff of creation felt at liberty to sing and use words of their own choice—rhyme or no rhyme—with the result that they frequently had vulgar songs so vile and rotten that no one ever attempted to set them to music and if ever published it would surely be a penitentiary offense. The sailors' words in the chantey are not unlike the Erie Canal mule drivers' cursing and swearing to his team. Both get results, but to say the least are entirely uncalled for and quite unnecessary.

Have you ever listened, on a moonlight summer evening, to the sound of the oars and the splash of water, as the oarsman pulled his boat in the stillness of the night and just far enough away for you to catch an occasional word as he talked to a companion, finally breaking out in a low, sweet song which gradually became more distinct, as the boat came nearer to the shore, and when within speaking distance the music ceased and you wished for just one more strain—is there anything sweeter?

There can be no comparison with the music coming over the water on a balmy day, when you hear a rousing chorus of men's voices as they chantey, while heaving up anchor on a packet ship lying in the stream, just far enough away to catch the strain, sometimes stronger and then again fainter as the wind wafts it in another direction, only to be returned again much stronger as the ship is being warped to the dock. When once heard it leaves an impression never to be forgotten.

As the ship draws nearer you hear the leading chanteyman sing his solo of a line or two, and before the last word is fairly out, the crew break in with a rousing chorus that none but men can quite equal. Verse after verse and song after song is sung. No matter if the sailor be an American, Englishman, Norwegian, or Frenchman, all know the chorus and come in with a will.

Many a chanteyman with a good voice but dull of comprehension would string out a chantey by repeating every line, using words with no meaning and sometimes without regard to rhyme or metre. But if he were original, he would make up verses as he sang, bringing in incidents of the voyage in such a vivid way that the crew redoubled their efforts at the capstan bars or ropes, thus getting more pleasure from the work and keeping them in a contented mood. A good chanteyman, therefore, was often paid more than the common sailor for his ability to get work out of the men, which was sometimes very much needed in ports where the crew were obliged to work the cargo.

As the ship neared the dock one could see the men walk around the capstan while they sang 'Heave away, Johnny,' and could pick out 'English Jack,' by his guernsey sweater and Scotch cap; 'Dutch Herman,' in his red shirt; 'Irish Patsy,' in his dungaree overalls; and the 'Yank,' with his sleeves rolled up and the neck of his woolen shirt unbuttoned and thrown back, exposing a chest sun-tanned from the tropical sea, as, in fact, they all were. The look of pleasure might be seen on their faces as they neared the dock and looked wistfully ashore, as much as to say, 'We'll soon be with you and forget the trials of a ten month's voyage.'

After the ship was made fast fore and aft, the last order from the mate was, 'Man the pumps, lads.' By this time the runners from the sailor boarding houses had been aboard and supplied the members of the crew with plenty of poor whiskey. Some were good-natured, while others showed ill temper and were inclined to be mean as they thought of their independence near at hand. When the pump-brakes were shipped into the break-beams of the pumps for the last time, they were still in condition to sing, whether the voyage had been a tough one or not. The chanteyman would jump on top of the pumps and pump beams holding on to the chain topsail sheets with his hands, and if able to stand would tread down on the brakes with his feet as the pumps were being worked by the balance of the crew at the hand brakes and start 'Leave her Johnny, Leave her.'

If the pumps did not suck by the time the chantey was ended, one might see an occasional sailor, who had imbibed too freely, desert his post at the pumps and walk with an important step to the forecastle where he would tell you that he was part-owner of the ship and he didn't see why he should work any longer, there being enough to do the work without him. Some had already changed their clothes and were ready to go with the boarding house runners who were doing their best to spirit the crew away. The officers by this time had the work in hand and could finish with the help of the boys, without making any trouble, and so, with blinded eyes would let the crew go, and so the voyage came to an end.

When the ship was ready for sea again, a new crew was shipped and the new chanteyman as a rule had his own favorite songs with entirely different words from those sung on the voyage just ended. While he might use different words for his solo, the air and the chorus were the same, for chanties have been sung from time immemorial. One writer says chanties can be traced as far back as the year 1450.

There are four different kinds of chanties, which may be classed as follows:—the Capstan, Long Drag, Short Drag, and Hand-Over-Hand.

THE CAPSTAN CHANTEY was sung while weighing anchor, hoisting topsails, loading or unloading cargo, warping, or any kind of work requiring a song at the capstan or windlass.

These songs are more harmonious than any of the others and in early days, when a packet ship had anchored in the stream, just in from a foreign port, and was getting ready to warp into the dock, while heaving up the anchor the chorus of the chantey could be heard by the people on shore, who gathered in large numbers on the pier head to listen to such

chanties as 'Rio Grand,' 'Sacramento,' 'Shenandoah,' etc. But today, everything is as silent as a man o' war, for the sailor hardly knows a chantey when he hears it. Steam has replaced the brawn and muscle of the old school, for every day our old sailing vessels are being fitted and equipped, one by one, with modern improvements. Steam and electric winches are being installed in our modern sailing vessels for hoisting sails and cargo. The gipsy-winch, for handling cargo, is already out of date and in another decade the common sailor will be insulted if the mate dares to issue an order to 'Man the capstan.'

THE LONG DRAG CHANTEY is a hoisting chantey and was sung at the topsail halliards as the yard was being mast-headed by hand. It required 'a long pull, a strong pull and a pull all together.'

One of the best known chanties for the topsails is 'Whiskey.' There was always a smile on the old salt's face when this song was started. It was usually the first pulling chantey sung by the new crew and as many of them came aboard drunk, either from choice or from being 'shanghaied,' shipmates could see the comical side of the conditions under which they came on board and no matter how hard their heads ached they were always there with a strong chorus. The remembrance of a jolly good time ashore helped to 'drive dull care away' and so made 'Whiskey' one of the most popular chanties.

The chanteyman led off in his solo, marking the time for the pull:—

Chanteyman: 'Oh, *Whiskey* is the *life* of man.'
Chorus: 'Oh, *Whiskey, Johnny.*'
Chanteyman: 'It *always* was since *time* began.'
Chorus: 'Oh, *Whiskey* for my *Johnny.*'

The capstan chanties usually have two choruses, a short, and a long one. The long drag chanties have two choruses, but are generally short and of the same length as the solo. This chantey was not confined to the topsail alone for it was also sung in any heavy work requiring a long hoist.

THE SHORT DRAG CHANTEY was usually sung in a gale of wind while hauling aft the sheet of the courses, boarding the main tack, or hauling out the bowline. It has one solo and a chorus, but there was no pulling until the last word was sung and then all hands exerted themselves as one, in a mighty pull.

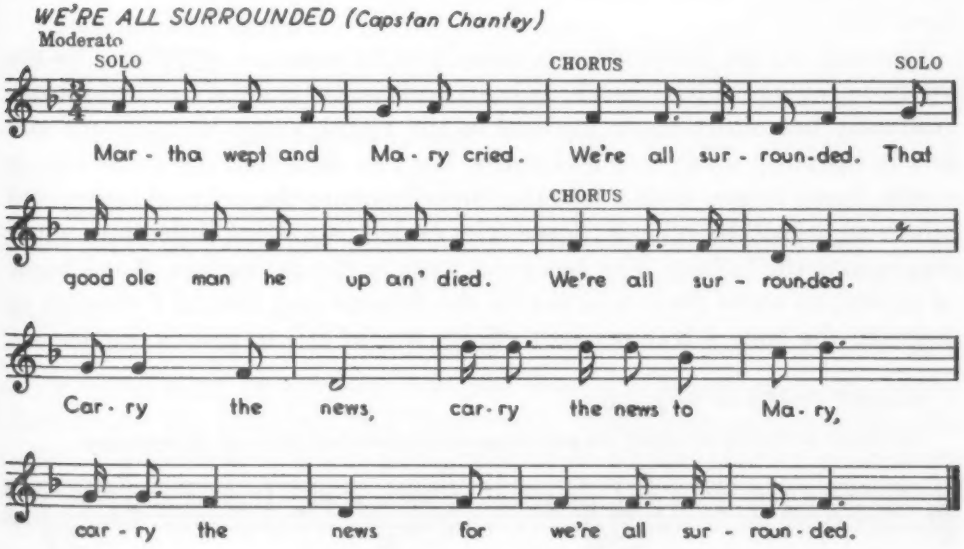
Chanteyman: 'Oh, haul, haul away, come haul and sway together.
Chorus: 'Away, haul away, haul away, *Joe!*'

To appreciate fully this chantey one must actually see or take part in the work. To stand knee deep in water at the lee scuppers, the seas breaking over the vessel as she gathers headway under the new stretch of canvas; with decks awash and the whole crew stringing out with feet braced, holding the fore-sheet with a deathlike grip in an effort to gain, foot by foot, the necessary amount of the sheet from the balloon-like sail which is straining and groaning to be free from the bolt-ropes and lash the waves with its ribbons as the good ship throws herself into a head sea. That is life on the ocean wave.

THE HAND-OVER-HAND CHANTEY was sung while hoisting light sails. With two or three men on the halliards, they all sang together as they hoisted hand-over-hand. Light sails were not confined, however, to this style of chantey, for they were often hoisted with a solo and chorus. The best known hand-over-hand chantey is 'The Drunken Sailor (Early in the morning).'

At the beginning of the nineteenth century chanties prevailed in minor keys. The sadder the words, the more mournful the tune. These doleful songs gradually gave place to something more lively, and in the days of the old packet ships, loading cotton before the war, we found the southern negro chanteying, while screwing cotton in place in the hold of vessels, with such songs as:

WE'RE ALL SURROUNDED (Capstan Chantey)



The negroes on the plantations sang an altogether different song. Their songs were of a melody in which harmony predominated. Not so with the sailor. He sang his song for a different method—to mark time, for concerted action, and usually the chorus was sung in unison by the members of the crew. The southern negroes are not gifted to sing a chorus in unison and consequently they employed their harmonious faculties on the chantey, with the result that the whites soon began to imitate them, picking up heavier choruses until the chanties reached their zenith in the 1870's. Then steam began blowing out the cylinder heads of the chanteyman and in the 1880's, a vessel without a donkey engine aboard was away behind the times. The anchor-windlass and capstans were connected with steam and the poor sailor and his chantey began drifting hopelessly down the bay and now are far out at sea, hull down—yes! topgallant yards only showing. In fact, now one scarcely ever hears the 'sing-out' from members of the crew, when pulling in the slack of a line—the spring, or bowline, as the ship is being moved ahead or astern while moored at the dock.

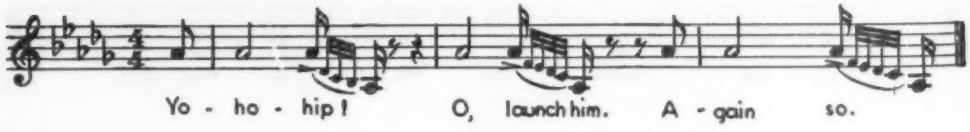
Sailors were so accustomed to singing out when there was a pull to be made, that I have actually heard an old sailor give a 'Yo-ho-*hip*' when pulling on his sea-boots.

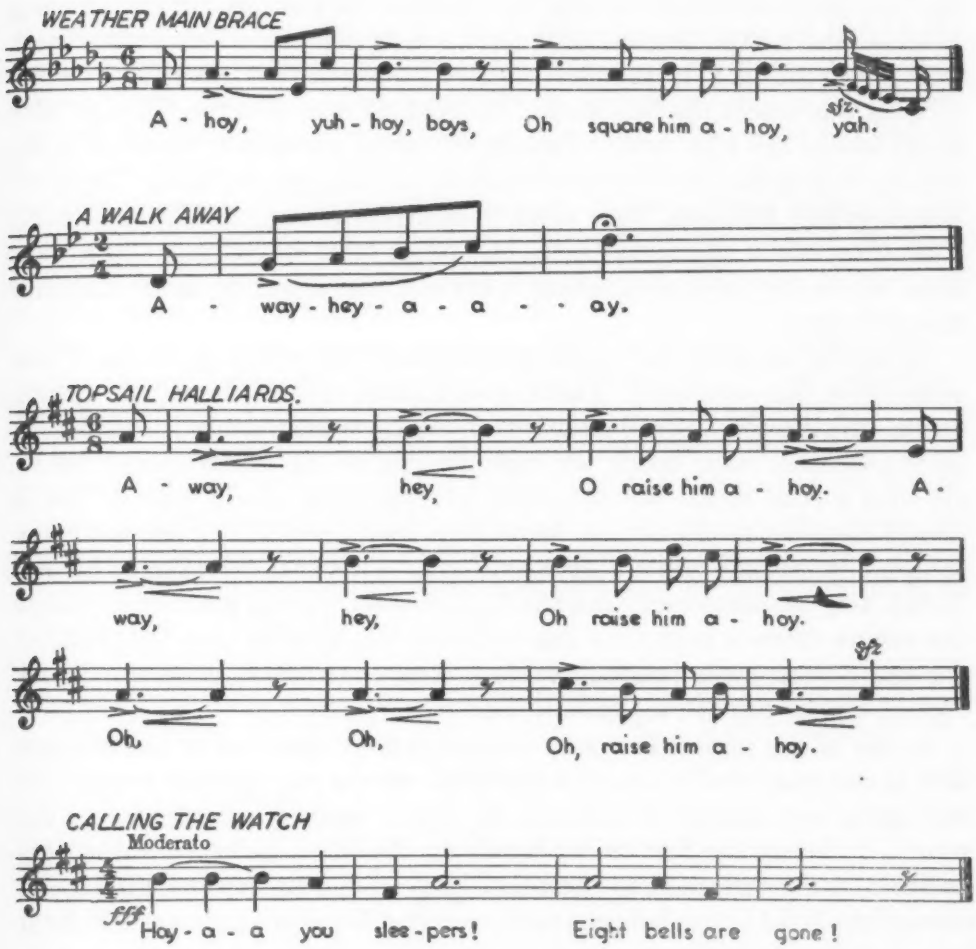
A timber was launched aft or a heavy object was always moved to the cry of 'Yo-ho-*hip*,' 'O, *launch* him,' 'O, *roll* him,' etc. A haul at a brace was made to the cry of 'A-way, *hey!*' 'Oh, ho-o boys!' 'A-hoy-*yah!*' 'Oh, *square* him!' etc.

The pull on the halliards was usually more musical, according to the man singing out. This was a long hoist and the cry started in a monotone, gradually becoming more musical as the chanteyman warmed up and finally bursting forth into a chantey. No two men had the same cry, as a rule. Some began with a falsetto, blending into the natural voice, and others were just the reverse. Some cries ended in a rising inflection, while others took the falling. The best cries were in the minor key. But I know of no way to write those which take the falsetto and should I attempt to describe the tone I fear my best efforts would fail to give it justice.

SHORT CRIES or Sing-outs.

In lifting or moving an object, the pull comes on the accent with a blast of the breath.





This was sung most vigorously by pounding on the fo'c'sle door with one's fist or belaying pin, usually to the time of the yell, and then, in an authoritative voice, 'Tumble out you starbolines! Shake a leg! Shake a leg!'

These short cries were not termed chanties. But a pull with the sailor, without a cry or 'sing-out' was like a team of horses pulling a heavy load under the guidance of a bank clerk. When one considers that the sailor was made to sing out when pulling on a rope; that he must creep before he walks and walk before he runs; his first attempt to imitate his shipmates was to sing-out on some short pull where he would not be seen or heard. Gaining confidence in his ability he could practice further on

the fore-sheet while helping the cook take in the slack as the yards swung around, and while the clew of the sail was being hauled aft with a brisk walk along the deck; he then felt entitled to sing-out his 'Away-hey-a-a-ay.'

This was where the boy shone. He had no fear that the 'Doctor' (the cook) would call him down when he led off in a sing-out; whereas at the braces, or halliards, he would be entirely out of place, for some 'Old Salt' would gruffly tell him,'Your place is behind the rest, ready for a turn.'

Singing out at the braces or in any other form of pulling, was always done by the chanteyman starting to cry out, and never by more than one man at a time.

In issuing an order for a pull on the braces, the officer in charge of the watch gave the command, 'There, give a small pull on the weather main brace.' Whereupon, some member of the crew answered, 'A small pull on the weather main brace, sir,' and the rest of the watch would follow aft with a rush to the weather rail, and the click of the patent blocks would ring out to the cry of 'Away-hey, boys,' etc. When the yard was squared in enough the officer would say, 'That'll do the main, belay!' 'Belay, sir,' was answered, and the boy who was always stationed behind the others threw a turn over the belaying pin, singing out, 'All fast.' If the rest of the yards needed bracing, they were taken in turn,—lower topsail, upper topsail, topgallant, and royal yards.

As the officer of the deck stood in his exalted position at the weather side of the quarter-deck, with a watchful eye on the weather to take advantage of any change of wind, so the sailor aspired to be leader of the watch, by being the first to lay hands on the rope, or brace, taking his position at the fall, next to the block, and with a hearty cry, giving the time of the haul to the balance of the watch who were strung out behind him and silently pulling to his music.

If any pull was done without a cry, which sometimes happened at night, because of the drowsiness of the watch who did not arouse themselves sufficiently to the occasion, or did not sing out as quickly as the officer of the deck thought they should, he would soon inform them, with an oath, that he wanted to hear a cry from someone, if it was nothing more than 'Go to h--l,' for he wanted to know just what was being done.

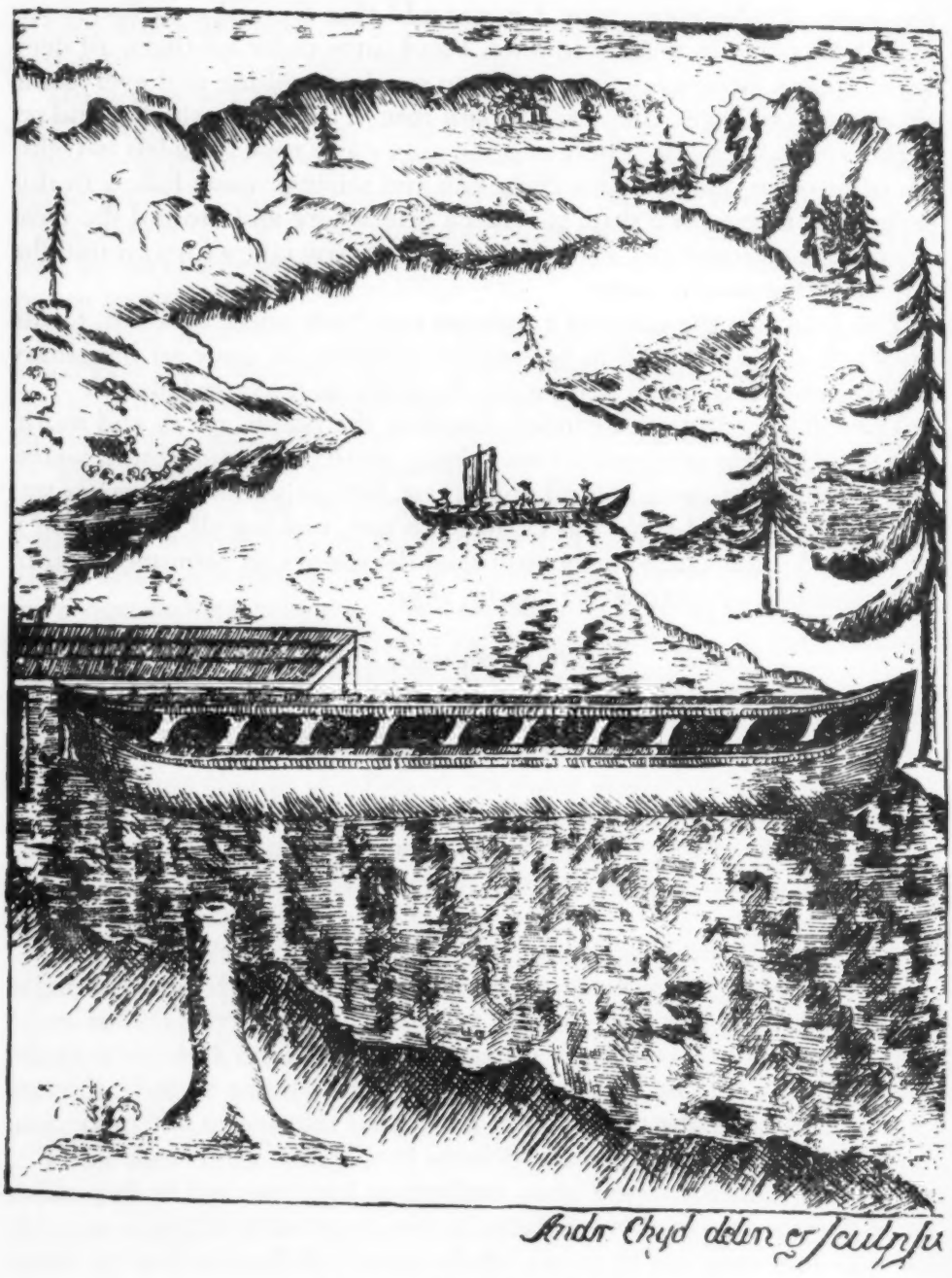
These short cries were not of stereotyped form. Each sailor had a peculiar yell of his own, and so familiar were they with each other's cry that one might lie in his bunk and although not able to see the work being done, yet he could tell by the sound the nature of the work and who was giving the cry.

I have tried to explain the chantey and sing-outs that are peculiar to the sailor. In this connection I might add that the sailor in the 1870's took great pride in sailor etiquette. I had three older brothers, all deep water sailors. Before my first voyage to sea they told me that everything aboard ship followed the sun. The sun rose in the east to the left and set in the west to the right. Therefore one must coil a rope from left to right; the tiller-ropes, lanyards, watch-tackles and seizings, must follow in this order, and in mooring ship, you run a line ashore and around the cleat or pile, from left to right, and coming inboard, you take a turn around the capstan in the same manner.

The points in the mariner's compass run from north to south, to the eastward, and I was told in boxing the compass, to draw an imaginary line from north to south, separating the compass into two halves.

The sailor's etiquette included changing the points, north and south, into two different pronunciations, calling north, *nothe,* and south, *southe,* thus making a *soft* sound for all points east. For all points west, *southe* was changed to *sou'* and *nothe* was changed to *nor',* making all points west a *hard* sound. I have previously published details of this pronunciation in THE AMERICAN NEPTUNE, VI (1946), 154.

(*To be continued.*)



American Birch-Bark Canoes

An Early Description of Birch-Bark Canoes

BY FERDINAND E. CHATARD

IN 1753 Anders Chydenius received his Master's degree from Abo Academy in Finland and the dissertation he submitted at that time was entitled 'American Bark-Boats.' Since it is an early description of Indian canoes—perhaps the earliest to appear in a pamphlet devoted entirely to the subject—it is felt that a translation of the more important passages and some comments on the author would be of general interest.

Chydenius was born at Sotkamo in Finland in the year 1729. He studied at Abo and Upsala until 1753 at which time he was ordained a minister. In addition to his chief vocation he also practiced medicine, wrote extensively on economic subjects, and was particularly interested in the economics of maritime commerce and the reform of the navigation laws. His interest in marine topics was undoubtedly a lifelong one since it is revealed already in the subject he chose for his Master's dissertation.

The selection of this subject for study during the completion of his schooling was undoubtedly influenced by several factors. Samuel Chydenius, the older brother of Anders, was also keenly interested in water transportation and especially in river navigation. Undoubtedly this topic was discussed frequently at home and entered into the early education of Anders, since during his early life, Finland was constantly at war with Russia. This war resulted in severe dislocation of all inland transportation and therefore stimulated the consideration of various methods of river navigation as a more feasible form of transportation. Finally, during his years at Abo and Upsala Chydenius came into close contact with Pehr Kalm, who in 1750 had returned from his well-known travels in America. Through Kalm's careful observations and reports, Chydenius was greatly impressed by the similarity in the topography of Finland and the lake and river region of northeastern America and therefore felt that the Indian bark-boats offered the best solution for Finland's inland transportation problem. He immediately began to obtain from Kalm all

the information possible regarding the construction and management of the Indian canoe and finally, under Kalm's direction and sponsorship, prepared his Master's dissertation.

In evaluating the facts presented by Chydenius it is most important to realize the influence exerted on him by Kalm. Since there was such a close association between Kalm and Chydenius at this time we must assume that Kalm himself was the real source of all the descriptive material contained in the paper. This is further born out by comparing the descriptions in Chydenius' article with those concerning canoes which appear in Kalm's *Travels in America*.[1] The similarity is striking although the material presented in Chydenius' paper is more complete and more fully organized. It is quite likely that Kalm not only read and approved the final draft of this dissertation but also criticized the sketch, reproduced herewith, which was drawn by Chydenius.

Before turning to the more interesting passages in the thesis the accompanying plate merits some special comment. It depicts birch-bark canoes both underway and beside a small landing. Although the drawing is not very detailed it shows two striking features. First, the fairly straight sheer line without the more customary upsweep at bow and stern is quite interesting.[2] This type of design was more characteristic of the canoes of the more western tribes. Secondly, the presence of a single square sail is especially noteworthy since there has been little, if any, evidence to indicate the use of sails by the North American Indian.[3] However, in 1750 the Indians had been in contact with the white man for many years and probably the use of sails had already been adapted to the bark canoe by this time even though this usage was never to become fully developed except as a racing sport. A statement by Kalm further substantiates the use of sails on bark canoes at this time, although it sheds no further light on the question of the native or imported origin of this usage. In a description of birch-bark canoes, Kalm says 'Birch-bark canoes are dangerous to navigate because if the sail is forced down in stormy weather it may splinter the bottom of the boat.'

Now let us proceed to the contents of Chydenius' dissertation on the

[1] Adolph B. Benson, ed., *The America of 1750; Pehr Kalm's Travels in North America* (New York: Wilson-Erickson, Inc., 1937).

[2] The Northeastern Algonkian birch-bark canoe is not noted for its upsweep at the bow and stern. The curling back of the bow and stern was most highly developed in the Great Lakes region particularly among the Ojibwa.

[3] The canoe sail was not, as a rule, used in the small lakes and rivers of the northeast, but there are references to its early use on salt water and the larger lakes. See William M. Beauchamp, *Aboriginal Use of Wood in New York*. New York State Museum Bulletin 89, Archeology 11 (1905), 141.

canoe. It consists first of a title-page which is chiefly noteworthy since it is stated there that the dissertation was prepared under the supervision of Pehr Kalm. There follows a dedication to the Bishop of Abo, written in the customary flowery language of the time, and attributing to him most of the current advances in Finnish science and commerce. This is followed by a letter to the author from his cousin, Johan Wellin, in which, after further comments on the glory of contemporary Finland, Chydenius is commended for his past contributions to applied science and for his present essay.

The first page is devoted to a brief introduction which mentions the following books consulted by the author:—

New Sweden, by Campanius
Histoire de Nouvelle France, by de Charlevoix
New Discovery of a vast Country in America, by Hennepin
Log of the Ship California *to Hudson's Bay*

However, the major credit for information is given to Pehr Kalm.

A translation of the remaining text follows:

'Since time immemorial the natives of North America have been using bark boats. Later, the French who possess territories where birch can be found in abundance, began to use them, and did this with remarkable advantage to all their commercial and other activities. These boats are made in the following manner:

'One cuts the bark from large and branchless birches in strips as long, if possible, as the boat shall measure because it is better if the boat is not pieced together, although this cannot be avoided when making very large boats. The edges are turned double and sometimes quadruple where the bark is to be pieced together and then with the help of fine pine roots split in two as many bark strips as are needed are sewn together so that the flat side of the piece is placed toward the seam which is made on the outer side of the bark and will lie on the inside of the boat.[4] The bark is placed on even ground, that side underneath or outward which had been on the inside of the tree and then one puts stones on the bark in such a form as the bottom should be. The edges of the bark are lifted up and poles are driven in the ground on each side so as to force the bark to take the shape of a boat which tapers off equally at both ends. Furthermore, one covers the bark on the inside with very thin strips of a tree called *Thuya,* or as the French call it "White Cedar," as wide as desir-

[4] Both the black and white split spruce roots were probably more often used than pine roots.

able,[5] but only as thick as a pertor (meaning small torches made of resinous sticks about one-eighth of an inch thick). These strips, or strakes, are placed firmly along the sides, close to each other, and are supported by two or three loosely mounted arches for the time being until the cross-strips[6] are placed on these strakes. These cross-strips should be bent in a half circle in the center of the boat but towards the ends become more pointed as the boat decreases in width. The cross-strips are also made of *Thuya,* usually three inches from each other, and they all extend with their tips up to the gunwale which is made thus: For each gunwale one whittles two narrow poles, flat on one side, which are placed with the flat side facing each other, on each side of the bark after it has been doubly folded, outwardly, about the width of a hand. The ends of the cross-strips, which should emerge between these gunwale poles, are made pointed and flat so as not to interfere with the stitching and binding. Then one takes pine roots made into fine strips, such as the last mentioned and binds the gunwale poles to the doubly folded bark so that not more than about half an inch is between, and in such a way that every loop goes through the bark. Then one makes thwarts, also from *Thuya,* two inches wide and one inch thick, blunt and somewhat wider toward the ends.[7] In each end of the thwarts three or four holes are bored in a line through which they are sewn to the gunwale twenty-four to thirty inches from each other so that the boat will not slacken. The bark, which is still open at the ends of the boat, is cut off a little from beneath so that the stem does not become quite square. Then the strakes which lie lengthwise along the boat are trimmed, with blunt ends and somewhat shorter than the bark, so that here again one can fold the edges of the bark inward, and sew the ends overlapping each other to form the point of the stem. Then another stitching is made in line with the former but about three inches therefrom and further inward, which pulls the strips from both sides together and makes the stem quite thin and taut. The stems (bow and stern) are then well covered with pitch and rosin and it makes no difference whichever stem one uses forward while rowing because both are equally pointed and equally high, and usually twelve to eighteen inches higher than the middle of the gunwale. In each stem a plank six inches wide extends across the boat and straight upward, to preserve the stems so that they will not be knocked by feet, oars and other things. The gunnels are overlaid with strips of *Thuya,* two inches wide and half an inch thick, which are made

[5] ***Thuja occidentalis L.*** is the tree referred to by the French as 'White Cedar.'

[6] These parts referred to as cross-strips are ribs.

[7] Thwarts of soft wood would be impractical as they were often used as seats. From an examination of existing models and old canoes it is found that a hardwood usually ash or oak was used.

fast with either wooden pegs or nails and which make the gunnels quite smooth. Along the bottom of the boat one can also place a loose plank containing a place for the mast which can also lean against and be made fast to one of the adjacent thwarts whenever one wishes to use a sail. Finally all the seams on the outside of the bottom are well covered with pitch or rosin so that the water will not penetrate through the seams; wherefor, while using the boat, one must carefully see to it that the pitch has not been scraped or melted away and must also be provided with a pitch pot wherefrom one could melt a little on a leaking place after the boat has been carried ashore and upturned. It is also advisable to be provided with some pieces of bark so that one may be able to make a patch should a stump or stone have torn a hole in the bottom.

'These bark boats, which are usually made from one and a half to seven fathoms in length, do not always have the same proportion for their width and depth; for our President [Pehr Kalm] has measured some in North America and found that one which was five and one-half fathoms (eleven yards) long was two and three-quarters yards wide in the middle and one and one-quarter yards deep.[8] Another that was eight and one-half yards long, was one yard wide and twenty inches deep in the middle, and a little lower at the stems. They can be rowed like other boats with as many pairs of oars as one wishes, although the French, as well as the American natives never propel their boats except with their faces forward and usually glide forward or paddle, as the English and the Swedes in Pennsylvania call it, and then the one who sits in the "stern" takes care of the steering with his oar. While using these canoes, one generally must take great care to go very slowly through shallow or muddy waters, otherwise it might happen that stumps, tree branches or rocks could tear the entire bottom off if the boat rushes against them with great speed. For this same reason when one approaches the beach it is not advisable to let the boat run ahead until she stops against the bottom but she should be slowed down and then one person steps into the water, to take the cargo off. If a woman or people of importance are in the boat, a man will lift them out and carry them ashore. However, neither would be necessary if only a pier were built out from the shore as shown in the copper etching, alongside which the boat could be fastened and onto which both people and cargo could be taken. Lastly, the boat itself should be carried onshore and upturned, for otherwise it would soon be pushed to pieces by trees and waves, or against beaches, rocks and branches, and in addition it would rot more quickly. But if one

[8] Undoubtedly the large canoes referred to by Pehr Kalm were the voyageurs' canoes used in the Great Lakes region and on the big rivers by the early fur traders.

fears that the heat of the sun might melt the pitch from the seams, one must cover the boat bottom with twigs, or else turn the boat with the bottom toward the ground although this must not be done in case she is to lie there for several weeks for the bottom bark would rot from the humidity emanating from the ground. These bark boats last more or less from three to eight years if they are well cared for and used in clear waters but they cannot endure long in shallow, impure, and rocky waters.

'But, however weak and dangerous these vessels may appear, they have remarkable advantages. For in the first place they move more easily and rapidly in the water than a wooden boat, they can carry a heavier load than wooden boats of the same size, and, what is most important, they can be carried without effort across country. Therefor, they have become for the Frenchmen in Canada, so indispensable that without them he could hardly do an eighth of the trade he is now enjoying with the use of these boats which can travel more than 800 Swedish miles (5,400 miles) through the country, and he would not exchange these canoes for several barrels of gold. Because the rivers further up in the unpopulated country are filled in many places with fallen trees, and in other instances have steep rapids and high waterfalls, and since in other places there are from one to several miles between two waterways, it would be almost impossible to progress with our type of ordinary wooden boats; and this is especially so since it often happens that one encounters, hardly a mile from the sea (or lake) a tremendous waterfall which cannot be passed by boat, although the river may be navigable for several miles above the falls. It is, of course, to be supposed that those who have always derided everything they have not been accustomed to since childhood, would also consider our use of bark boats more ridiculous than useful, but one has no reason to doubt either its possibilities or advantages since these canoes have been described by many as a most valuable conveyance which is in actual use all over North America. Our President, [Pehr Kalm] himself, has traveled in them in Canada, more than forty Swedish miles (two hundred and seventy miles), across very large lakes. He took with him four full grown men as oarsmen and the provisions together with other things weighed as much as five more men. When they came to the end of Lake Champlain and had to cross about half a Swedish mile [3.4 miles] of country to Lake St. Sacrament, one of the men put the boat on his head and carried it thus all the way (without resting more than once on the way) and with such speed that the others could not keep up with him.

'All the circumstances which make these bark boats indispensable for

the French in America also make their usefulness to us indisputable. Are not the greater part of our Finlandish parishes so isolated that the people cannot come to church during the summer without unbelievable difficulties, because of the many strips of water and land lying between? This, however, they could easily overcome if only they brought such a bark boat with them. How many homesteads are there that have not one or several lakes for fishing which, however, they cannot use without building a separate boat for each one? But how easily could not a man bring a little bark boat along first to one lake and then to the other, and thus do his fishing when and in which ever lake he chose. But what is most important: how much could not these boats contribute toward the advancement of trade activities in our sparsely populated Finland? Our land is more dotted with lakes and rivers, big and small, than perhaps any other part of the world, but the former are often separated by so called "earth backs" (ridges) one to several quarter-miles wide while the latter, on the other hand, have some steep rapids and waterfalls which often cut off all traffic through the streams. Both could be neatly overcome by our bark boats, because at these "earth backs" or difficult waterfalls, the boat, and likewise the cargo, could be carried over or around them. It is also easy to understand that these boats can more easily be dragged over those bridges (plana inclinata) which are used over difficult waterfalls, than our ordinary boats. It is noteworthy that at Niagara, in North America, between the lakes Ontario and Erie, one must carry the boats all of one and a half Swedish miles [10.2 miles] overland across three very high and rather steep mountains, because one cannot possibly travel the mile and a half by boat, partly due to the rapid currents which in a moment would overthrow the biggest and sturdiest boat, partly due to the great Niagara Fall which if not the highest, certainly is the largest in the whole world, since all the waters coming from lakes Superior, Huron, Michigan, and Erie each of which is not much smaller than the Baltic, are hurled down over a mountain whose vertical height is somewhat over 70 yards. When our President [Pehr Kalm] visited this Fall he observed with amazement how easily a bark boat of six fathoms length was carried these one and one half Swedish miles [10.2 miles] by seven men who turned the boat, bottom up, lifted it by the gunwales on their shoulders, and ran with it so fast that our President had difficulty in following them. It would be unreasonable to doubt the possibility of travelling up and down through our rapids with these boats provided only that all careful steps be taken to clean up the rivers, stake out the main current, etc.

'Who cannot see, also, how convenient these bark boats would be during present hostilities, partly for small patrols, partly for transport of troops, etc.?

'Since I have now presented to the unprejudiced reader the usefulness which our fatherland, too, could obtain through these American bark boats if they became universal, I will also briefly mention how they are just as possible to manufacture here as there. Have we not the same birches as are found in America from which we can obtain the bark? Our spruce and pine roots are just as good for sewing bark together as theirs. Pitch and rosin we have in abundance, and in place of their *Thuya* we can use our spruce for strips, thwarts, strakes and gunwale poles, since this wood because of its lightness and toughness seems most suitable, or if desirable some other kind of wood could be used.

'In conclusion I leave it to the approval of the High Authorities if it were not advisable to let the common people in this country make one or several such bark boats for testing purposes, in order that they might acquaint themselves with the manner in which they are made and also the advantages in their use, and thus be persuaded to make for themselves these very handy skiffs.'

Tonnage—Weight and Measurement

BY JOHN LYMAN

TONNAGE was defined by Moorsom as 'the term by which we form an idea of the magnitude of a vessel.' In Volume V of THE AMERICAN NEPTUNE,[1] I outlined at some length the development of the concept of register tonnage, which is a fiscal measurement based on the internal volume of a ship. It is now proposed to treat of the kinds of tonnage that are based on the weight of a ship or of its contents.

It is seldom, in practice, that a ship is actually weighed. Instead, the naval architect computes from his drawing the volume of water displaced by the hull at each foot or so of draft, and prepares a scale of displacement (Figure 1). Since thirty-five cubic feet of sea water weighs precisely a ton (2240 pounds), and since by the principle of Archimedes the displacement of a floating body equals its weight, the tonnage of a ship corresponding to a given draft is obtained by a simple computation. The definition of *displacement tonnage* therefore is the weight of the hull and contents of a ship at any specified draft, expressed in long tons of 2240 pounds. In metric system countries, displacements are usually expressed in metric tons of 2240.6 pounds, which is also the weight of a cubic meter of fresh water. The naval architect there computes his displacement in cubic meters, and then multiplies by 1.024, the weight in metric tons of a cubic meter of sea water.

Naval architects sometimes use *molded displacement*, which is the displacement computed to the outside of the frames, and does not include the submerged volume of planking or shell plating. They fell into this habit in wooden ship days, when it was reckoned that the average density of the planking, with copper and fastenings, was the same as that of water, so that omission of the planking was without influence on the hydrostatic computations. In wooden ships this quantity amounted to six or seven per cent of the molded displacement; in steel vessels, the displacement of

[1] Pages 223-234, 311-325.

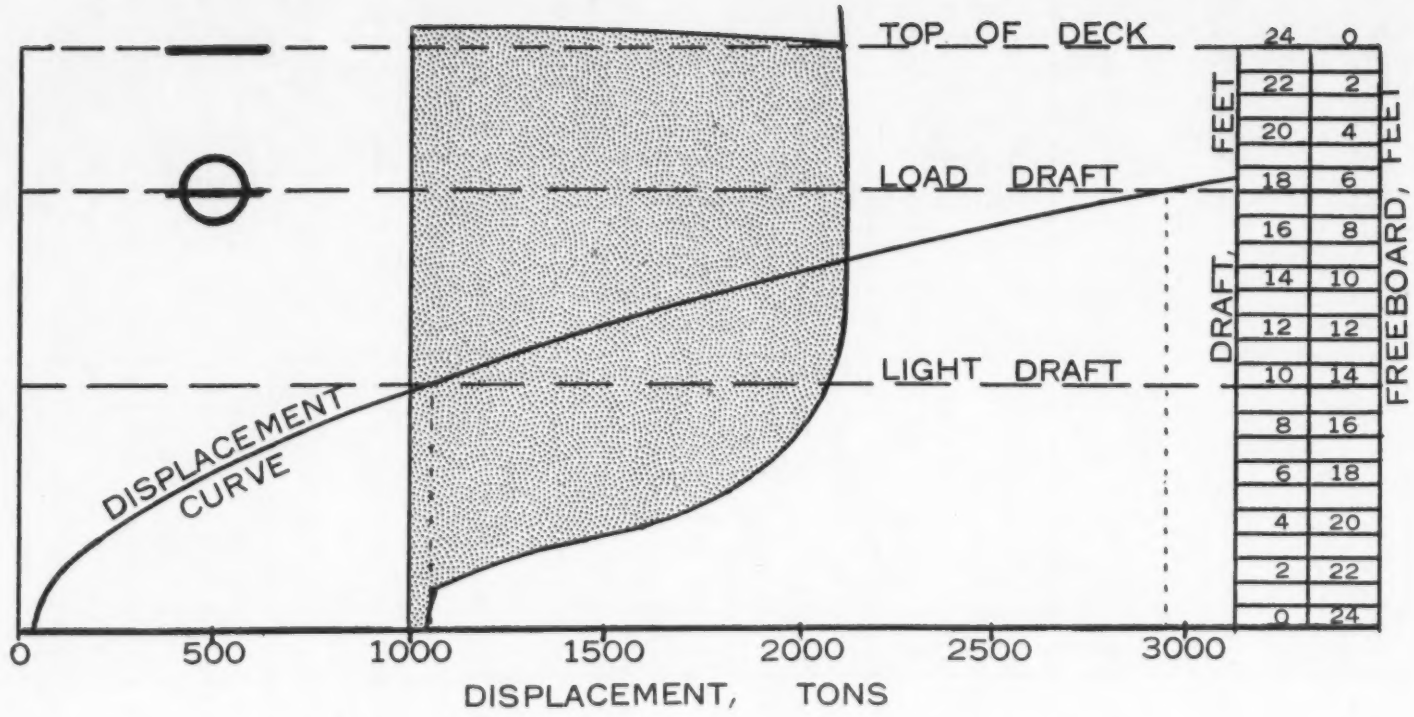


Figure 1. Typical displacement curve. The deadweight tonnage of this vessel is the difference between her light displacement (1040 tons) and loaded displacement (2970 tons), or 1930 tons.

the shell plating is only about one per cent of the total, but this quantity is often held back by the designer in the early stages of his work, in order that the finished vessel may not exceed her intended light draft.

For war vessels, several different displacement tonnages, corresponding to several different conditions of loading, have been recognized. *Full-load displacement*, as understood in the United States Navy, results when the ship is in every respect ready for service, having water in the boilers and machinery at steaming level; with a full complement of officers and crew and their effects, and full allowance of ammunition and stores; with lubricating oil, fuel oil, and diesel oil tanks 95 per cent full; and with potable water, reserve feed water, and gasoline tanks 100 per cent full. *Normal displacement*, a term formerly used, which reflected approximately the average conditions during a long voyage, was with two-thirds of stores, oil, coal, and water aboard. *Standard displacement*, as defined in the Washington and London treaties, was with all the items listed under full-load displacement except fuel and reserve feed water. *Light displacement* represents only the weight of hull and fittings, since it excludes ammunition, stores, fresh water, fuel, and reserve feed water; water in boilers and machinery, in trimming tanks, and double bottoms; and officers, men and their effects. Thus a 10,000-ton 'treaty cruiser' (standard displacement) might have a light displacement of 9,000 and a full-load displacement over 13,000; and by loading the bunker tanks 100 per cent full, it would be possible to exceed full-load displacement by 150 tons or so.

Although the French had been using displacement tonnage to characterize their war vessels for many years, it was not until 1872 that it was adopted officially in the British navy, and for several years thereafter builder's old measurement still appeared alongside it in the Navy List. Displacement was also officially introduced into the United States Navy in the seventies, but 'tonnage' (meaning carpenter's measurement) was not dropped until after 1900.

In the case of a merchant vessel, the definitions dealing with displacement are somewhat different, since cargo weights have to be considered. Until the passage in Britain of the first loadline act (1876), with which the name of Samuel Plimsoll will forever be associated, there was no fixed limit on the draft of a merchant ship, and hence any discussion of merchant vessel displacement before this period can be only in general terms. The displacement of a ship was limited by the draft at the ports to which she traded, the prudence of her master, or the avarice of her owner.

Loadlines were not provided by law in the United States until 1929; but in 1890 a British law required them for all vessels trading to British

ports; and meanwhile the classification societies established their own rules, compliance with one or another of which was essential if the ship and cargo were to be insured. Ships therefore generally bore on their sides the 'Plimsoll mark' as shown in Figure 2, even though it was not yet required by law in their land of registry. The International Loadline Treaty of 1930 finally brought uniformity to most of the maritime world.

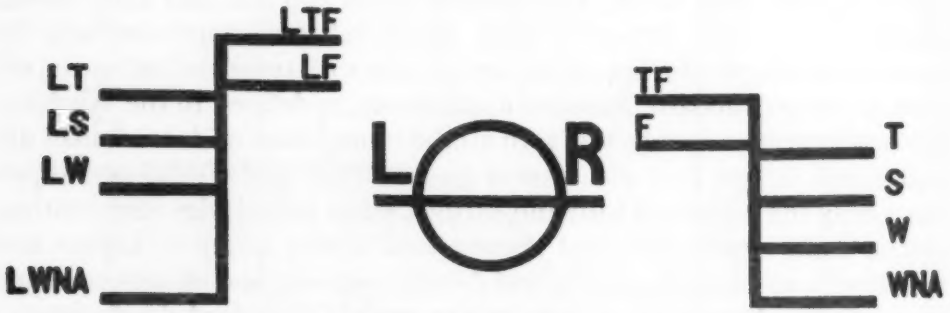


Figure 2. Plimsoll mark of a modern freighter. The letters on the central disk stand for the classification society, in this case Lloyd's Register. The four loadlines on the extreme right are for *Tropical, Summer, Winter,* and *Winter North Atlantic* loading conditions respectively. If loaded in fresh water to the TF or F marks, the ship will rise on entering salt water to the T or S marks, as the case may be. The loadlines on the left are for use when the ship carries deckloads of lumber, whose buoyancy permits deeper loading, except for winter on the North Atlantic. Previous to 1930, the mark T was IS, signifying *Summer Indian Ocean.* The WNA mark is carried only by steamers under 330 feet in length. A sailing vessel carries only F and WNA markings, in addition to the summer draft on the disk.

It will be observed from Figure 2 that there are several different drafts to which a vessel may be loaded, depending on season and ocean; but in practice all computations concerning merchant ship loaded displacement are made to the summer draft mark. For a modern merchant vessel, then, *load displacement* is the calculated displacement to the international summer loadline. *Light displacement* is the weight of ship and engines, with water at steaming level in the boilers, before loading cargo, stores, fuel, water, dunnage, or crew and their effects. *Deadweight tonnage* is the difference between these two figures; in other words the dead weight that can be loaded into the empty ship before submerging the international loadline. *Deadweight cargo,* also called *useful* or *paying deadweight, dead load,* or *burden,* is the number of tons remaining after deducting from deadweight the weights of fuel, water, dunnage, stores, and crew and their effects. Dead-

weight, and not deadweight cargo, is the usual basis for comparison of cargo vessels, since deadweight cargo will vary with the weight of fuel and stores taken aboard, which in turn varies with the length of voyage to be performed, while deadweight is a constant.

Deadweight tonnage, although widely used in shipbrokering circles, does not seem to have been employed by an agency of the United States government until creation of the Shipping Board in 1916. As an additional refinement, to express the relative voyage performance of sailing vessels, the Board also introduced the term *steamship equivalent deadweight*, which was forty per cent of the computed deadweight of sailing vessels.[2]

In addition to its usefulness in characterizing the size of a vessel, displacement tonnage can be made to give an indication of the sharpness of a vessel's underwater lines. The product of length, beam, and draft, called *block displacement*, has sometimes been proposed as a more suitable basis for dock charges than register tonnage. If we take the length on the load waterline, the greatest beam on or below the waterline, and the load draft, the product of these quantities (in feet) divided by thirty-five is the displacement of a rectangular block with the same maximum dimensions as the underwater portion of our ship, and the ratio of her actual displacement to this fictitious displacement is a measure of the sharpness of her submerged form. This ratio, the *block coefficient of fineness*, varies from only 0.3 in fin-keeled sailing yachts, through values of 0.4 for steam yachts, 0.5 for clipper ships, 0.6 for fast steamers, 0.7 for ocean liners and large sailing ships, and 0.8 for tramp steamers, reaching a maximum of possibly 0.9 in scows and 1.0 in many suction dredges.[3]

When all the quantities necessary for the computation are available, therefore, the block coefficient will add to the characterization of a vessel by showing to what extent the designer compromised between speed and carrying power in laying down her lines. Conversely, when the load displacement of a vessel is unknown, it can be closely approximated from her waterline dimensions and draft, by assuming a value for her block coefficient based on that of similar vessels.

War vessels generally have a lower block coefficient than merchant vessels, even though their lines may actually be no finer. This is due to the fact that a merchant ship usually has more or less of a parallel-sided middle portion, since it makes her easier to build, to tie alongside a wharf, or to get into a dock or canal. War vessels, on the other hand, have a 'flat

[2] Deadweight, in turn, was computed as 150 per cent of gross tonnage.

[3] George Simpson, *The Naval Constructor* (4th ed., New York, 1918), 47-48, 60-83, has some very useful data on block coefficients of various vessels.

iron' shape, with a greater maximum beam, which, however, is not carried fore and aft any distance.

It should also be pointed out that the block coefficient is a true constant only at a specified draft, and that the same ship will have a higher value for the coefficient as her draft increases, since the portions of the hull nearer the deck are fuller and thus approach more closely the theoretical block. Naval architects frequently compute the block coefficient using the depth from the waterline to the rabbet of the keel, instead of the actual draft. This introduces a negligible error in the case of a modern steel vessel with flat plate keel, but will be significant with a bar keel, and may amount to a ten per cent uncertainty in a wooden hull.

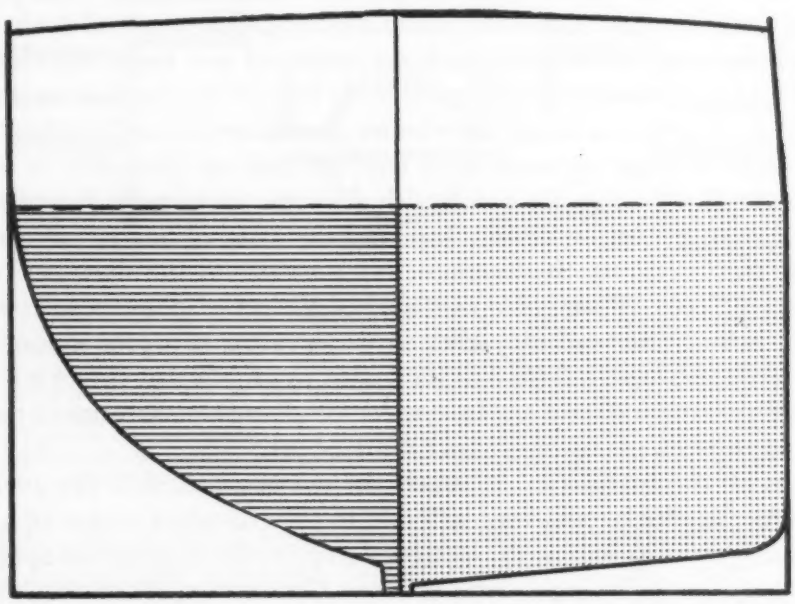


Figure 3. Midship sections of a relatively full-bodied vessel (right), with coefficient of midship area about .92, and of a sharper vessel (left) with coefficient about .68. The coefficient of midship area is the ratio of the shaded area to that of the circumscribing rectangle.

A ratio similar to the block coefficient is that found by dividing one hundred times the underdeck tonnage by the product of length, beam, and depth of hold. The coefficient of fineness yielded by this method, where the length is measured on the waterline, is used in freeboard tables for establishing loadlines. The American Bureau of Shipping uses an *equipment tonnage* found by reversing this formula: length on waterline is multiplied by extreme beam, by depth of hold, and by the coefficient

of displacement taken at eight-tenths of the molded depth, and the product divided by one hundred.

Another useful ratio is the *coefficient of midship area*, Figure 3, which is found by dividing the area of the greatest midship section by the product of beam and draft.

The weight ton universally used in English-speaking countries when dealing with ship displacements is, it will be observed, the *long ton* of 2240 pounds. The source of this ton, like that of the register ton, can probably be traced back to the wine *tun* of 252 gallons of 231 cubic inches. Dry wine weighs about 8.2 pounds to the gallon, so that a full cask would hold some 2066 pounds; adding an estimated 290 pounds for the weight of the container brings the total up to 2356 pounds. A ton of 2352 pounds (21 cwt. of 112 pounds) is indeed recorded in older books of reference as a 'long ton' or 'Cornish mining ton.' The more common long ton of 20 cwt. or 2240 pounds was doubtless chosen for the convenience of dividing it into halves or quarters, while the *short ton* of 2000 pounds can be interpreted as an approximation of the weight of contents without the container.

The volume of 252 gallons corresponds to a cylinder 3½ feet high and 3½ feet diameter, or 33.69 cubic feet. The closest packing of such shapes will require 37.15 cubic feet ($3\frac{1}{2} \times 3\frac{1}{2} \times 3\frac{1}{2} \times \cos 30°$); add the thickness of the staves and each tun will occupy a little over 40 cubic feet of the ship's hold. Hence, in estimating the freight to be paid for bulky goods it became customary to allow 40 cubic feet as the equivalent of a tun.

Thus the medieval wine tun is the ancestor of the register ton, which is now reckoned as 100 cubic feet of ship; the weight ton, now either 2000 or 2240 pounds; and the *freight ton*, now taken as 40 cubic feet of cargo. There have been other values to the freight ton; for example Trinity House packets were allowed 72 feet in 1706;[4] and it appears that the East India Company used 50, since that value has persisted in Indian trade and was also used by British sailing ships in China. Today, a cubic meter (35.31 cubic feet) is sometimes used in metric system countries.

At the present time, it is customary for steamship operators to quote a freight rate at so much per ton. Upon receipt, the goods are both weighed and measured, and the rate is then applied to the basis that yields the greater revenue. A recent survey of American lines showed that in foreign trade the ton used is 40 cubic feet or 2240 pounds, while in domestic trades the rates are based on 2000-pound tons or 40 cubic feet. Some lines

[4] John Haskell Kemble, 'England's First Atlantic Mail Line,' *The Mariner's Mirror*, XXVI (1940), 197.

that compete with railroads quote rates per 100 pounds or per cubic foot, but these rates equate 40 cubic feet to 100 pounds. A line trading to Mexico published northbound rates per metric ton or cubic meter. A few other special rates for specific commodities will be discussed below.

An occasional tonnage for description of a ship has been obtained by dividing the internal hold volume in cubic feet by forty, which represents the tonnage of measurement goods that could be carried, assuming that all packages could be stowed tightly together without voids or dunnage. It is preferable, however, to regard a cargo ton as a unit for measuring not ships but cargo. Nowadays it is customary to express the capacity directly in cubic feet, distinguishing between *grain cubic*, which is computed from measurements taken to the inside of the shell plating and to the underside of the deck, and *bale cubic*, for which measurements are made to the inside of frames or cargo battens and to the underside of deck beams. Both of these figures, as well as deadweight tonnage, can be found in *Lloyd's Register* in addition to register tonnage, while the American Bureau tabulates bale cubic, load displacement, deadweight, and register tonnage.

When a ship loads both weight and measurement goods, it is possible to lift a 'tonnage' of cargo that greatly exceeds any ordinary description of her capacity. Assume, for example, that a ship of 3000 tons deadweight with bale cubic of 150,000 (3750 measurement tons) is to load copper ingots that stow 10 cubic feet to the ton, and cotton bales at 90 cubic feet to the ton. It would be feasible to fill her with 1500 tons of copper (15,000 cubic feet) and 135,000 cubic feet of cotton (1500 deadweight or 3375 measurement tons) and collect freight on 4875 tons (1500 deadweight and 3375 measurement).

The *stowage factor*, the number of cubic feet of cargo that weighs a ton, is a quantity of importance not only to shippers and stevedores, but also to designers and operators of ships. A ship intended for cargoes of high stowage factor needs a larger ratio of bale cubic to deadweight than one carrying deadweight cargoes, while a deadweight carrier loaded with light goods is likely to have impaired stability. Sailing ships formerly had to carry ballast under cotton, jute, or case oil cargoes, but modern steamers, using their double bottoms for water ballast, can handle relatively light cargoes without the necessity of additional ballasting. Stowage factors for a wide variety of commodities are tabulated in such works as *Modern Ship Stowage*.[5]

[5] Washington: Government Printing Office, 1942.

At this point it may be fruitful to give some general relationships between the various kinds of tonnage for merchant vessels of the nineteenth century. Richard Henry Dana,[6] writing of American ships of the period 1830-1840, reported that the capacity of sharp ships for measurement goods was 1 to 1½ times their custom-house measurement, and of full ships 1¾ to 2⅓, larger vessels taking the larger factors respectively.

In 1854, Moorsom[7] reported that capacity for measurement cargo was 1⅞ times the register underdeck tonnage of his system, while deadweight was 1½ times the same quantity. H. A. Sommerfeldt[8] at about the same period reported that for ordinary sailing vessels the molded displacement was equal to $(1 + 0.5/m)$ times deadweight, where m is the coefficient of midship area as already defined; for clipper types the factor was $(1+0.6/m)$. In iron ships the hull weight is somewhat less, and hence deadweight is a larger fraction of total displacement; steel ships are lighter still. Moreover wooden hulls increase in weight with time, as the timbers absorb water; metal hulls, if anything, lose weight slightly through corrosion.

For more recent ships it is probably misleading to present simple ratios, since there is a great deal of variation in modern merchant ship types. Figure 4 is an attempt to illustrate the relationship between registered length and load displacement, deadweight, bale cubic, and gross register for recent steel cargo steamers, while Figure 5 shows the load displacement, deadweight, and gross register for steel sailing vessels of the period 1875-1905.

In addition to all the various kinds of tonnage that have been described, it is not uncommon to find the magnitude of vessels expressed in terms of the quantity of a particular cargo they can carry. Lumber is an obvious example of this type of measurement. Since it can be carried on deck, cubic capacity is no criterion of the amount that can be loaded; neither is deadweight, since the ordinary type of vessel cannot support enough deckload to bring her down to her summer draft line. Lumber vessels, particularly on the West Coast, are therefore rated according to their lumber capacity.

The usual unit of lumber in this country is the board foot, a piece a foot long, a foot wide, and an inch thick. The wholesale unit, 1000 board feet, commonly abbreviated 1 M, occupies 83.3 cubic feet. Stowed aboard

[6] *The Seaman's Friend* (Boston, 1841), 14.

[7] 'On the New Tonnage Law, as Established in the Merchant Shipping Act of 1854,' *Transactions of Institution of Naval Architects*, I (1860), 128-142.

[8] *Elementary and Practical Principles of the Construction of Ships* (London, 1860), 11-12.

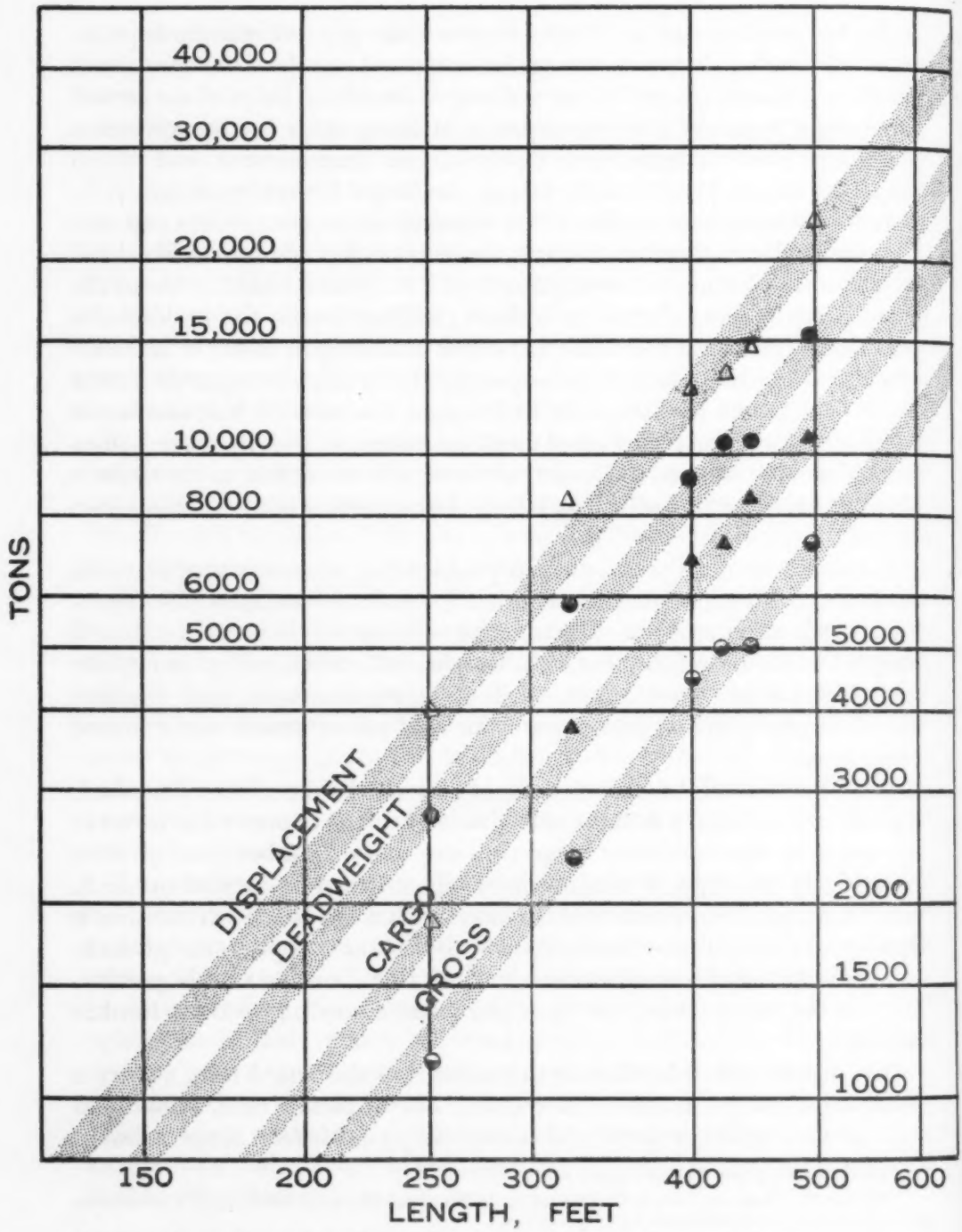


Figure 4. Approximate relationship between registered length and tonnage of recent cargo steamships of 'full scantling type,' from 125 to 650 feet long, between 800 and 50,000 tons. 'CARGO' is bale cubic capacity expressed in tons of 40 cubic feet. The points plotted are some United States Maritime Commission designs.

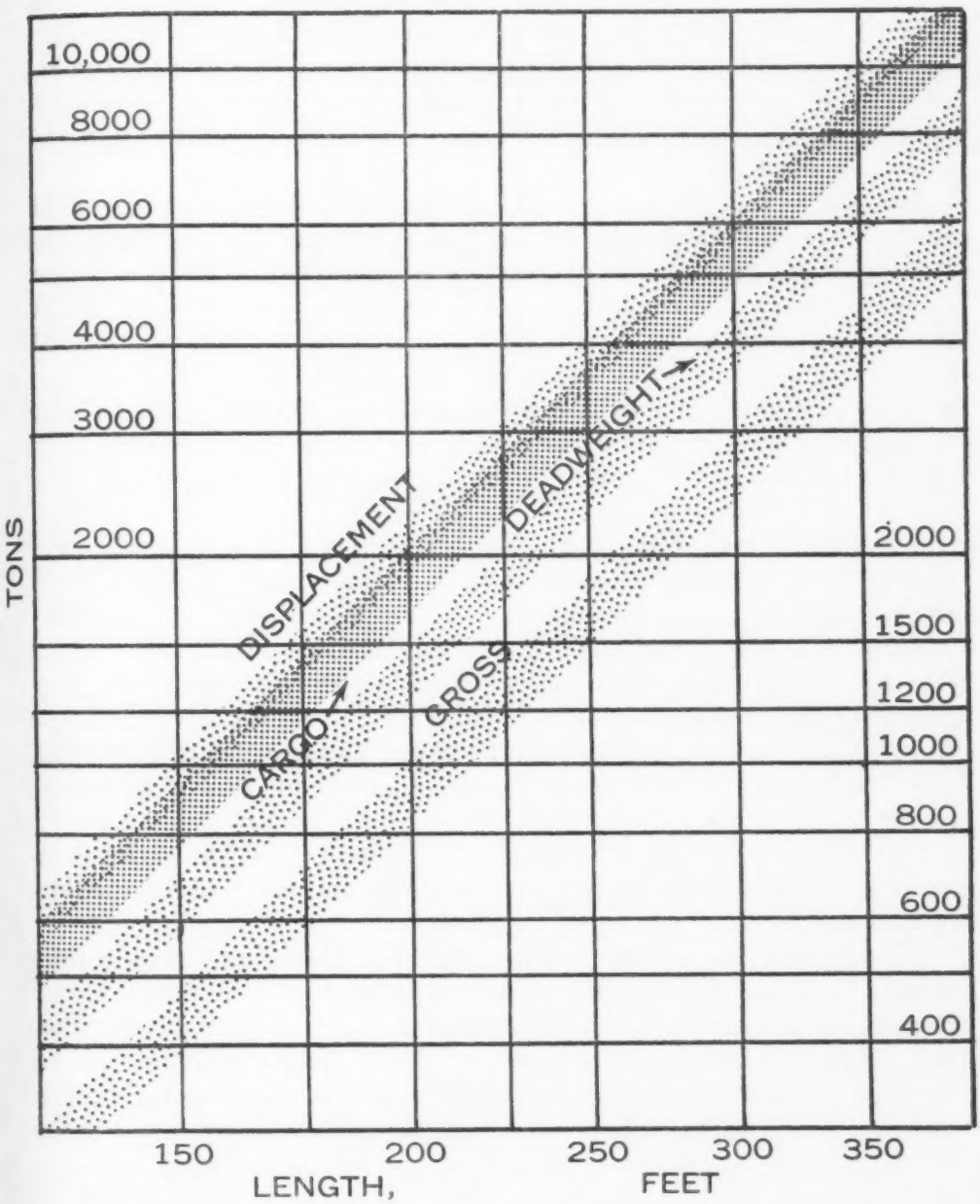


Figure 5. Approximate relationship between registered length and tonnage in iron and steel sailing ships of the period 1875-1905, between 125 and 400 feet, and 300 to 12,000 tons. Note the overlap between 'DISPLACEMENT,' which is the immersed external volume of the ship to the loadline, in tons of 35 cubic feet, and 'CARGO,' the bale capacity of cargo spaces, in tons of 40 cubic feet.

a vessel, however, it requires from 110 to 130 cubic feet, bale, depending somewhat on the skill of the stevedore. In the coasting trade, freights are paid on nominal size; thus 150,000 linear feet of 2 x 4's is rated as 100 M; but in the intercoastal and foreign trades actual measurement is used, and the same quantity of 2 x 4's, which are actually dressed to 1⅝ x 3⅝ inches, would be only 74 M.

Douglas fir lumber loaded in the summer weighs 3230 pounds per M feet (in the rainy season it is rated as 3360 pounds, or 1½ long tons) and if this uses up 120 cubic feet of space, the stowage factor is 83. The largest cargo ever loaded on the Columbia River was taken to the East Coast by *Andrea F. Luckenbach* in the summer of 1937. It measured over 11,000 M gross measurement or 8910 M net measurement. Since *Andrea F. Luckenbach* was a vessel of 770,409 bale capacity, it is obvious that she had a large deckload. The weight of the cargo was some 12,850 tons, and the rest of the ship's 14,400 deadweight was probably taken up by stores and fuel oil for the round trip.

Lines that carry a good deal of lumber usually publish rate schedules giving freight rates per M feet, but 600 board feet is sometimes taken as the equivalent of a measurement ton, although this quantity is actually 50 cubic feet. The freight for logs is often figured by finding the board feet from the product of the length and the squared mean diameter; sometimes five per cent is arbitrarily added. Piling, however, is carried on a purely linear basis, 30 feet of length and any diameter being equivalent to a ton (with 13⅞-inch diameter, 30 feet of length squares out to 40 cubic feet).

In northern Europe the common unit for lumber cargoes is the *standard* of 1980 board feet, although other values for the standard are occasionally encountered.

The common volumetric unit for petroleum is the *barrel* of 42 gallons or 5.61 cubic feet. Traditionally, this represents the result of carting oil from the fields in an open-ended 50-gallon container, although an equivalent unit can be traced back to a much earlier period. Petroleum products vary somewhat in specific gravity, from heavy fractions that barely float on water to gasoline and naphthas with density as low as 0.67. The customary method of expressing specific gravity is in American Petroleum Institute degrees defined by

$$°\text{API} = (145.88 - 135.88 \times \text{sp.gr.}) / \text{sp.gr.}$$

Average crudes, gravity 25.9°, work out at exactly 40 cubic feet to the ton, and tankers are commonly designed so that a full cargo of this gravity

will bring them down to the summer loadline. It is essential that all tanks be kept completely full or else left empty, as the effect of free liquid surface is extremely deleterious. Therefore small auxiliary tanks, called *summer tanks*, are provided; and with these empty the ship loads only to her winter loadline. When carrying products of a lower specific gravity[9] than that for which she was designed, a tanker will be full before she has reached her summer draft mark; hence in describing tankers it is customary to give their tank capacity in barrels as well as their deadweight. The designer computes the capacity just as grain cubic is figured for a freighter, except that two per cent is held back to allow for possible thermal expansion of the cargo after loading.

Whale oil, in the heyday of the New Bedford industry, was measured in barrels of 31½ gallons. Nowadays the whaling industry uses a barrel of 50 U. S. gallons, and the specific gravity of whale oil is such that six of these barrels make a long ton of oil.

Before the general introduction of tankships, refined oils were exported in 5-gallon cans. Two cans were boxed in a wooden container measuring about 10½ x 21 x 15 inches, or 1.9 cubic feet; if the contents were kerosene the weight was 83 pounds, giving a stowage factor of 51. Sailing ships usually needed a little ballast under so bulky a cargo, and they were chartered by the case rather than by the ton.

Like petroleum, coal varies somewhat in specific gravity. Good Welsh steam coal works out at just 40 cubic feet to the ton, and many authorities consider that coal cargoes, rather than wine cargoes, are the source of that conversion factor. North Country coal is given as 43 cubic feet to the ton, and the same figure is commonly used in the United States for steamship bunkers. There is more variability in cargo coal, as anthracite is a little denser than bituminous, while screened grades are much lighter since there are no fine pieces to fill the voids.[10]

The earliest wholesale unit for measuring coal seems to have been a volumetric one, the *chaldron*. This is the same word as caldron, meaning a large pot or basket. Its dimensions are uncertain; but the weight of its contents was fixed by law in 1694 as 53 cwt. or 5936 pounds; while at the same time the *keels*, square-rigged lighters that carried coal down the Tyne to sea-going vessels, had their maximum load fixed at 10 chaldrons and were required to be marked at stem, stern, and amidships at the corresponding draft. This is a very early example of a statutory loadline.

[9] Spoken of as 'higher gravity' in the oil industry, since the API formula gives higher numerical values for lower specific gravities.

[10] Cf. A. S. E. Ackerman, 'Open Packing of Spheres,' *Nature*, CLV (1945), 82.

Somewhat later, keels were built to hold 8 chaldrons or 21.2 tons, having dimensions close to 42 x 19 x 6 feet, with 4½ feet draft; and the *keel* of that weight was used as a unit for expressing ship size.

Another chaldron, the London chaldron of 36 heaped coal bushels, was 58.64 cubic feet, and there were 15½ of these in a keel. The Newcastle chaldron therefore was 113.5 cubic feet, which gives 43 cubic feet to the ton; just the figure already stated for North Country coal.

In the extensive grain trade out of West Coast ports formerly carried on by sailing vessels, three different units were employed: the *bushel* (60 pounds of wheat or 48 of barley) by which grain was bought from the farmer, the long ton by which ships were chartered, and the 100-pound *cental* by which grain was sold in Liverpool. The grain was actually carried in 140-pound sacks, weighing about one pound apiece empty, so that seven-tenths of one per cent should be added to the indicated weight of a cargo to obtain the true cargo deadweight. On the East Coast, steamers were frequently chartered for grain cargoes by the *standard*, which was 480 pounds of most grains, but 320 pounds of oats. The 56-pound bushel of corn is sometimes encountered as the unit of vessel size on the Great Lakes, while 160-pound bags of rice are the standard of measurement among the archaic sailing ships of the Burma-Ceylon trade.

The commerce of the port of New York may have been founded on the beaver skin, but it rose to national primacy on the flour barrel, which was frequently used as the unit of ship capacity. By law, the barrel was 27 inches long and 16½ in diameter at the head, holding 196 pounds of flour with a gross weight of 215 pounds. Six cubic feet was taken as the volumetric equivalent,[11] giving a stowage factor of 63 and pointing to the necessity of ballast under the cargo in full-bodied ships.

Fibers likewise are bulky cargoes requiring ballast. American cotton bales weigh approximately 480 to 530 pounds and are nowadays compressed to about 14½ cubic feet, giving a stowage factor of about 65; formerly they were around 30 cubic feet, so that stevedores had to screw the cargo into the hold to increase the load. Jute is loaded in India in 400-pound bales, compressed to not over 10.4 cubic feet, and five bales are taken as a ton. Australian wool averages around 400 pounds per bale; but there is a wide variation in weight.

Until quite recently, the Hawaiian sugar trade was based on either the short ton or on a bag of 125 pounds gross weight, the empty sack weighing

[11] Charter party of North German brig *Alma*, October 1868, in *A Century of Ship Agency and Brokerage* (New York: Funch, Edye & Co., 1947), 24.

just a pound. The standard Brazilian coffee bag holds 131 pounds of green coffee.

A few other articles of freight do not fit into the general pattern. Bullion or 'treasure' is carried at a percentage of its value. Livestock (like passengers) are carried at a rate per head. Bricks (under 8 pounds each) are often freighted by the thousand.[12] One line carries cremated remains at the same charge per urn as for a ton of merchandise, while for a corpse it asks the equivalent of 25 tons!

[12] A thousand bricks weigh about 2½ tons. THE AMERICAN NEPTUNE, I (1941), 88.

Emigrant Ship to Copra Hulk: The Iron Bark Bougainville

BY HAROLD D. HUYCKE

THOUGH the modern age of steam- and diesel-driven ships has relegated her to the obscure rôle of a copra hulk, the iron barge *Bougainville* of Noumea, New Caledonia, remains in existence today as an example of British iron shipbuilding of over four score years ago. As the iron full-rigged ship *Himalaya* she was built by Pile & Hay at Sunderland, England, in 1863 to the order of J. D. Tyser & Co., for the Australian trade. Her measurements were: length, 201.6 feet; breadth, 33 feet; depth, 20.5 feet; registering 1027.15 gross tons, 976.8 tons net, 893.5 under-deck tonnage; light displacement 700 tons, loaded 2150 tons.

At that date she was considered a large vessel as iron ships went, but did not establish a name for speed or other exceptional performances in that vein. Her construction required eleven months, and, according to Lloyd's reports, she was built with thicker plating than the Lloyd's Society required of vessels in the years 1864-1871 for A-1 Classification. No doubt this partly accounts for her longevity and present existence. As a full rigger she carried double topsails, single topgallant sails and royals on all three masts, being rerigged to a bark in 1880. She had a long topgallant forecastle measuring thirty one feet in length, and a sixty-foot poop which ended with a well-rounded stern and stylish half-round.

Tyser operated her for only two years, then sold her to Shaw, Savill & Co., who placed her in the emigrant trade from United Kingdom ports to New Zealand. This company had been established in April 1858 and for many years competed with the New Zealand Albion Line until 1882 when they merged to become Shaw, Savill and Albion Co. This union of the two companies provided stronger competition to their principal rival, the New Zealand Shipping Company. Before abandoning sail in 1908 Shaw, Savill & Albion owned more than forty sailing ships, ranging in size from four hundred to fourteen hundred tons, one of which was *Himalaya*.

In the middle of the last century Australia and New Zealand were becoming fields for emigration, but in the early years of settlement government subsidies were required to induce and assist emigrants and their families to make the voyage from the United Kingdom to the lands down under. *Himalaya's* first voyage for Shaw, Savill & Co. began presumably at London whence she sailed on 2 November 1865 commanded by Captain Cow. She passed the Lizard three days later and sighted the Snares[1] on 27 January 1866, arriving at Lyttelton on 3 February ninety-one days out from London.

Himalaya's second voyage, still under Captain Cow, was full of incident as illustrated by an account in the *Lyttelton Times,* published at Christchurch, New Zealand, on Monday, 11 February 1867. Lacking journalistic form and including only facts as would be entered in the ship's log-book, it is doubtless the captain's personal report of the voyage.

Arrival of the ship *Himalaya* 10th February 1867 from London, Captain Cow. Left the East India Docks (London) on 1 November 1866, sailed from Gravesend on 2 November at four P.M. Sunday, 4 November passed the Downs but heavy gales from West coming up and night long and dark; put back into the Downs for safe anchorage. Wednesday 7 November made a bargain with a large steamer to try to tow her to Dungeness; proceeded as far as Folkstone, gale increasing, and had to bear up a second time for the Downs. Remained at anchor, blowing gales of wind from West till Friday 9 November. Steamer towing to Dungeness with a lull, pilot left off the Owers on Saturday 10 November. Encountered nothing but gales until Tuesday 13 November, bore up and ran for the Motherbank for shelter, remaining there until Saturday 17 November. Weather moderating, made sail and pilot again left at noon. Passed St. Katherine's at One P.M.; gale coming away very hard at West on Monday night Ten P.M.

Passed Madeira 1 December, crossed the Equator 19 December. 8 January 1867 passed Cape of Good Hope; 9 January observed a small iceberg and some floating ice; 15 January passed a large iceberg. On 28 January at break of day in 48°-44′ South, 116°-26′ East observed a fearful barrier of ice as far as the eye could see; (it) ran from East Northeast around to South with bergs packed inside. Kept ship to North under easy sail passing through very large quantities of ice at night. All day long during the following day many large bergs were seen, the last one at Ten P.M. Such fearful masses of ice have never been seen by the oldest man on board making the Southeastern passage.

It is feared that the ice will prove the cause of many missing ships. 7 February blowing a whole gale of wind at North Northwest with tremendous high sea; obliged to run the ship to the Southward. At noon the Snares Rocks bore East Northeast thirty five miles distant. At four P.M. passed close to them, but the weather was so thick we could not see them. At ten P.M. that night ship out seventy-eight days from

[1] A group of rocks called the Snares are located about 60 miles SSW of Stewart Island off the southern end of South Island, New Zealand. Vessels voyaging out to the east coast made their landfall at the Snares, bearing up to make arrival at port only a day or two later.

the Lizard Light. At midnight the gale broke so hauled to Eastward and made Banks Peninsula by Eleven P.M., anchoring in Lyttelton Harbor at Two P.M. Sunday 10 February 1867, one hundred and one days from the docks. Passengers all well. Ship has a general cargo and some useful birds for the colonies, pheasants, partridges, etc.

Saturday 8 December Robert Gamble, third class passenger died, complaint obstruction of the bowels, age thirty years. On Tuesday 1 January 1867 a sad accident occurred at Five-thirty A.M. A poor boy, Albert Hill fell from the mizzen royal yard after loosing the sail and fell into the sea, ship going eight and a half knots at the time. In a few minutes Mr. Bruce, Second Officer and six hands were away in the lifeboat but the poor boy had gone down. Recalled the boat by signal, got them safely on board and proceeded on the voyage.

Himalaya was consigned to E. S. Dalgety & Co., bringing a hundred and forty government-assisted immigrants to Lyttelton.

During the next five years *Himalaya* voyaged elsewhere, quite possibly to Australia, and during this time Captain Friston succeeded Captain Cow in command. In the winter of 1872-1873 *Himalaya* made a ninety-four day voyage from England to Lyttelton. Among the passengers was a Mr. Charles Parkin whose daughter recently wrote of the few incidents on shipboard that had been told to her.

I remember my parents saying Dr. Bell-Hay was a great favorite on the ship; he was friendly with all. He was not a strong man and had travelled on the ship for the sake of his health. A family from Scotland named McIntosh had a son born on the trip who was named 'Thomas Himalaya,' and who died about two years ago [1945]. The McIntosh family went farming in the North Canterbury District and we often visited them in the olden days. Also remember Mother telling us of a young couple who had just married and came out to New Zealand. She was very nervous and frightened when the ship rolled and would call out, 'Oh, Willa, Willa (for William) we shall be drowned!'

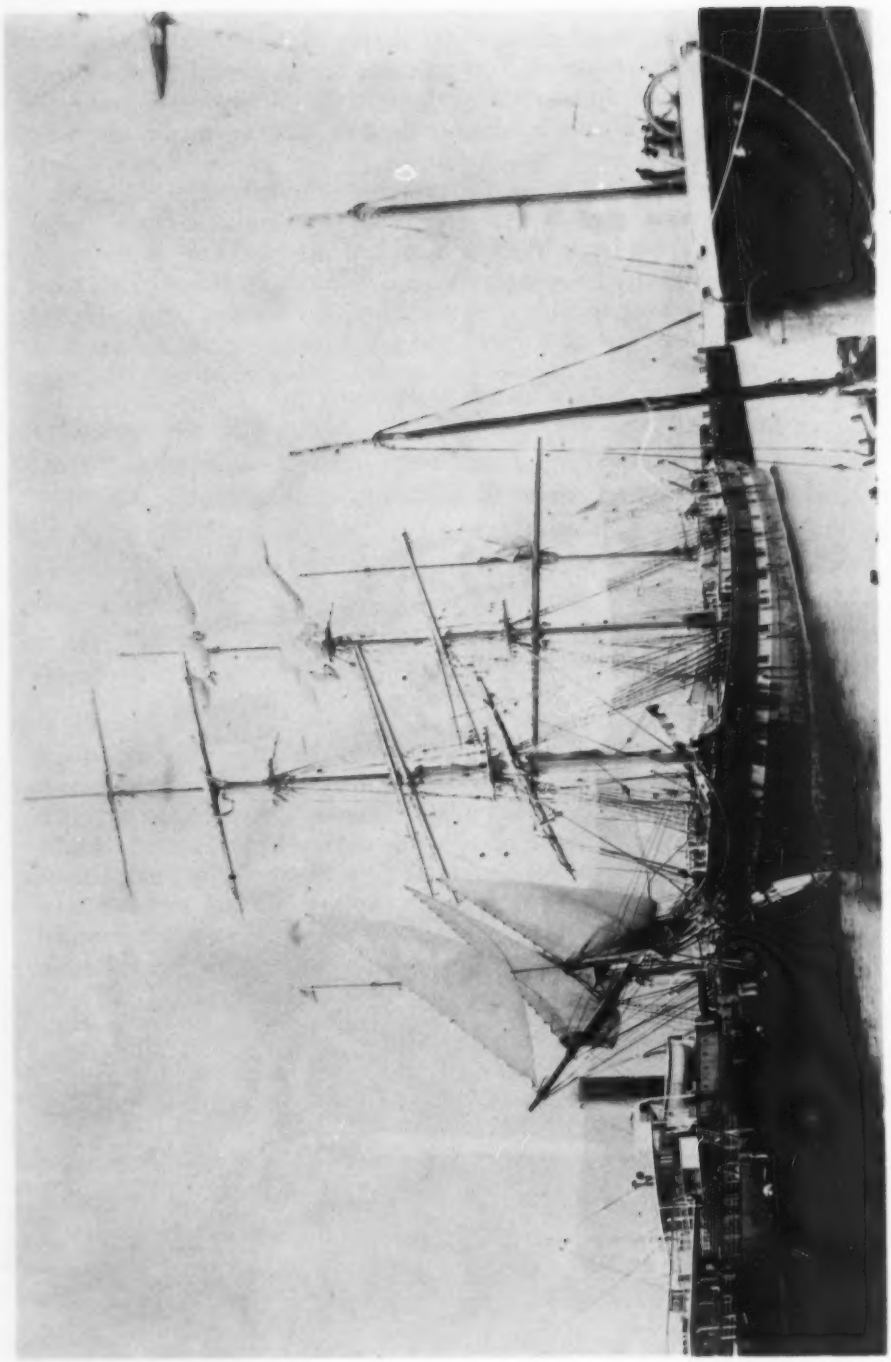
In 1874 *Himalaya* deviated from her emigrant route and took a load of coal from Newcastle, New South Wales, Australia, to San Francisco, arriving on 12 November of that year. Homeward bound from the Golden Gate the best part of five months was required, after which Captain Grant relieved Friston, the former remaining with the ship for only two more trips to the colonies.

Another descendant of *Himalaya's* many passengers is Mr. W. Hurcomb of New Zealand, whose parents emigrated from England in 1875. Concerning their voyage, he has written:

In the year 1875 my father and mother arrived at Lyttelton from Plymouth, England, as immigration passengers in the *Himalaya*. The fare was two pounds each, and the food was very rough, consisting of bully beef and biscuits. However they were

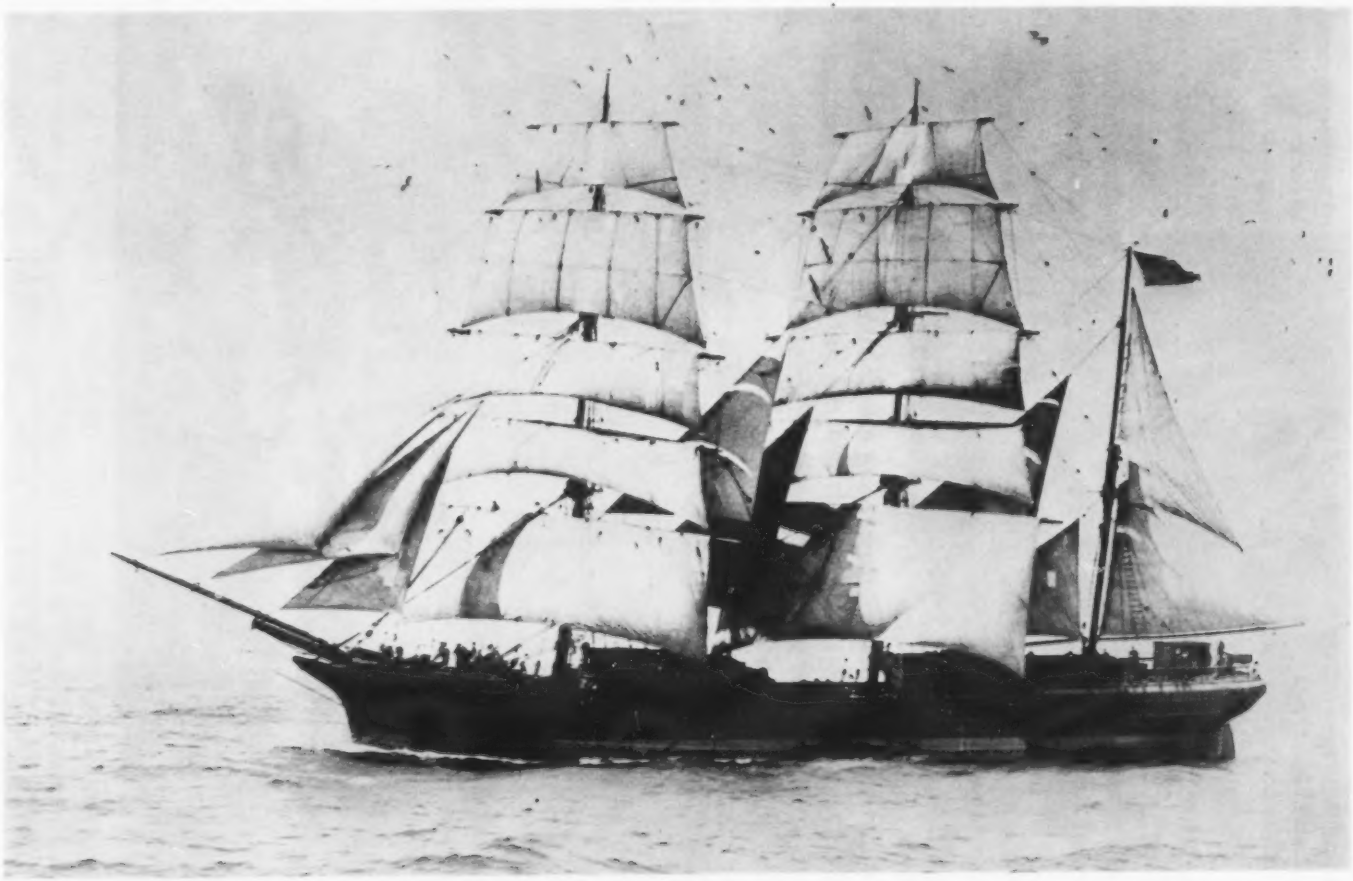
Bark *Star of Peru*, ex-*Himalaya*

Reproduced from a photograph by Charles M. Loring through the courtesy of The Mariners' Museum



Bark *Himalaya*

Reproduced from a photograph by Nautical Photo Agency

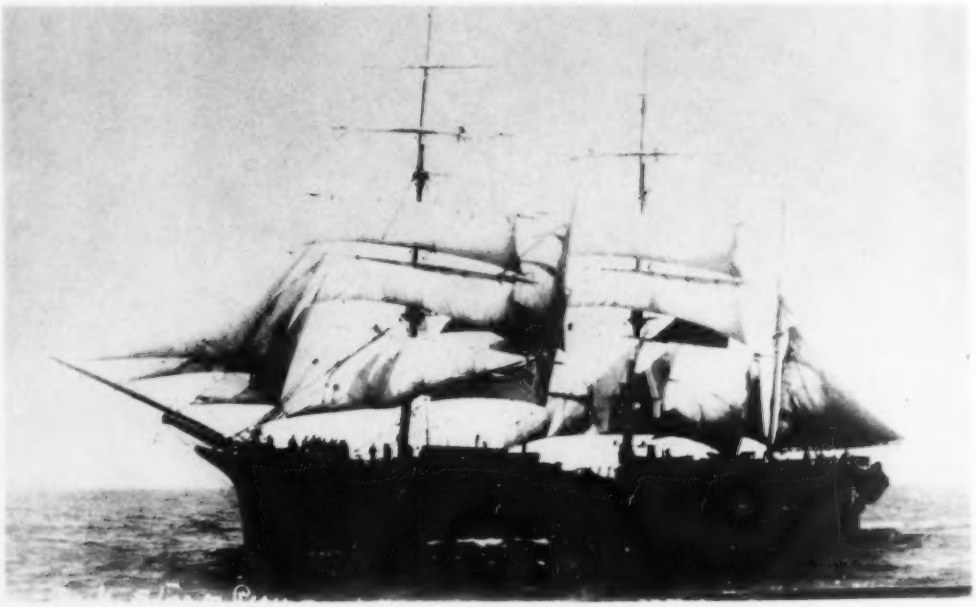


Bark *Star of Peru*, ex-*Himalaya*

Reproduced from a photograph by Morton Waters Co.

Figure-head of bark *Star of Peru* in Alaska Packers Association Yard, Alameda, California, 1934

Reproduced from a photograph by John Lyman



Bark *Star of Peru*, ex-*Himalaya*

Reproduced from a photograph by Allen's Photo Supply Co., San Francisco

able to get something from the canteen on board and it cost them twenty-five pounds by the time they arrived in New Zealand. They used to tell us about the old *Himalaya* and the rivalry that existed between the captains in those days—who could make the fastest trip out. . . .

Himalaya arrived in Wellington on 24 January 1877 and during the discharging of her cargo a fire broke out on board. The results were not disastrous but a new double deck was laid to repair the fire damage and a notable lawsuit ensued. Captain Williams took command upon her return to England and made an eventful voyage to Lyttelton early in 1878. Bad weather was the order of the day and a hundred and twelve days were required for this passage, ninety-three land to land. Twelve days were lost in the Channel and seven more on the New Zealand coast. From 19 March till 25 March in the vicinity of Good Hope the ship experienced severe gales which caused considerable damage to her deck houses carrying away two boats and flooding the saloon. A sea as high as the cross-jack yard broke aboard washing the Chief Mate forward and the two quartermasters away from the wheel. Fortunately no lives were lost, but personal injuries were inflicted upon a couple of the crew. While running her easting down she met with more severe gales which prevented the carrying of sail for days at a time.

Ninety days from England to New Zealand was *Himalaya's* best time during her thirty-three years in the Colonial trade and this was far from clipper time. Three to four months on the outward passage was her usual performance and about the same time home via Cape Horn rounded out a year's sailing. No record of her homeward voyages is available but it may be assumed that most if not all were around Cape Horn, thus making a complete circumnavigation of the globe about every ten or twelve months. Thirty-odd years of battling gales off Cape of Good Hope and storms off Cape Horn was a severe test for ships and men, but *Himalaya* and her crews were equal to it and many hundreds of passengers were transported safely from the old country to the new.

Under the British flag the vessel's passages were made to four principal New Zealand ports: Auckland, located on the west coast of North Island; Wellington located in Cook Straits on the southern tip of North Island; Lyttelton, which was the port for Christchurch and located on the east coast of South Island; and Port Chalmers on the South Island east coast, the port for the town of Dunedin. These two last-named towns were each ports in their own right, being but a few miles apart. *Himalaya's* average passages to New Zealand were:

United Kingdom to Lyttelton, ninety-three days;
United Kingdom to Port Chalmers, one hundred and three days;
United Kingdom to Wellington, one hundred and eight days;
United Kingdom to Auckland, one hundred fifteen days;
Total average from United Kingdom to New Zealand,
one hundred and five days.

Captain Williams took *Himalaya* for only one round voyage in 1879 and turned over his command to Captain Pitfield who made the next voyage out to Lyttelton in ninety-one days. This was one of the ship's three best voyages and during the following year she was converted to bark rig under Captain Culbert. Culbert had her for five years and made only one passage out in less than a hundred days, this being also to Lyttelton. His last voyage in the ship began at Greenock on 1 July 1885 and took one hundred and eighteen days to Port Chalmers, arriving on 29 October. Miss C. B. Donaldson of New Zealand, then a small child of seven, recently commented on a few instances of shipboard iife on *Himalaya* sixty-two years ago.

We left Greenock in July 1885 and took a hundred and eighteen days,[2] arriving in Dunedin some time late in October. I came with my parents, brother and sister and don't believe there were any (government subsidized) immigrants on that voyage. I know our passages were paid and as far as I can remember we had plenty to eat. We had a terrific storm at one time, lasting for three days during which time no one was allowed on deck. As soon as the storm abated Captain Culbert had the various children. about seven of us up on the poop where we sat and watched the huge waves. I was very fond of Captain Culbert. When I was running past him he would catch me and give me a hug, and I have wondered since if he had children of his own. If so, it must have been hard to be away from them for so long a time. I don't remember if it was during that storm or another one when I had been very sick and my mother had put me astride the door to get some fresh air. She held me very tightly by the hand but two huge waves came on deck and washed me off my feet. I think I can still hear the captain's voice roaring out, 'For God's sake, catch hold of that child.' One of the cooks came running along catching hold of the rigging and caught me just in time.

We also had a fire. The carpenter had left a tin of tar on the galley stove which boiled over and started a fire on deck. When called he grabbed the tin with his bare hands and threw it over the side of the ship. That strip of tar was on deck for the remainder of the trip and may be there yet. That poor man was terribly burned about the face and hands but it was a brave thing to do in saving the ship. A fight amongst the sailors resulted in the First Mate being stabbed in the shoulder and one sailor, a Swede named Anderson, was handcuffed to the side of the ship.

[2] One hundred and eighteen days required as sea time, one hundred twenty-one for the entire voyage.

Captain Culbert relinquished command to Captain Paterson in 1886, who in turn was relieved by Captain Hill in 1890. During Hill's five years in the bark from 1890 till 1895 *Himalaya* made her best and worst passages each in the New Zealand trade. She arrived in Auckland on 25 September 1891 a hundred and twenty-six days out from London, and it was on this longest of all her passages that *Himalaya* suffered what was probably her worst storm damage to that date. During the first week of June 1891, scarcely ten days out from the Thames, severe gales struck her causing considerable damage. Two months later, while in the south Atlantic, Captain Hill was compelled to heave to for forty-eight hours during a three-day storm, with heavy seas breaking over the ship. Bad weather followed her as she ran her easting down, catching up three weeks later when a twenty-four hour gale with mountainous seas lashed at her. Three days later the most severe gale ever encountered by Captain Hill forced him to heave to again for three more days. Bulwarks and everything moveable on deck were carried away in addition to flooding the cabin and doing great damage.[3]

Himalaya sailed from England on 7 November 1893 for Port Chalmers, arriving on 5 February 1894 after a passage of ninety days which was her best. Later that year still under Captain Hill and on his last voyage in the ship she left Liverpool on 9 November and experienced a succession of heavy southwest gales until passing the Canary Islands when she met with the northeast trades. She rounded the Cape on 18 January 1895 passing several icebergs. Fresh westerly winds then favored the ship till 24 January when she was off the Crozets. Captain Hill stated on arrival in New Zealand that from the Cape to the Crozets was the most trying time as icebergs were in sight for a distance of two thousand miles.[4] Ten days were required to get through Cook Straits, whereupon *Himalaya* arrived at Wellington on 25 February 1895 after a stormy passage of one hundred and nine days.

After discharging her cargo and passengers at Wellington the bark departed for Dunedin, South Island, to load for home, but was forced to heave to under topsails for the best part of a day off the Banks Peninsula before reaching port. Upon her arrival in England Captain Hill turned the ship over to Captain H. Mann, who took *Himalaya* out for the last time to New Zealand under the British flag. She sailed from England on 19 Feb-

[3] Sir Henry Brett, *White Wings* (Auckland: Brett Publishing Co., 1924), 140.

[4] Actual distance from Good Hope to Crozets is 1800 miles. If this report is to be taken literally, *Himalaya* would have averaged over three hundred miles a day for six days which is excellent time for a ship that held no pretenses of being a clipper.

ruary 1896 and made a better than average passage of ninety-three days to Port Chalmers, arriving at that port on 2 June.

The heyday of the small iron thousand-tonners was passing, and steamers had made serious inroads on the passenger trade during these latter years of the nineteenth century. Shaw, Savill & Albion sent *Himalaya* to San Francisco the next year where she arrived on 1 October 1897. In 1898 she was sold to J. J. Moore & Co. of San Francisco but placed under Hawaiian registry in command of Captain R. H. Dearborn.

For a little over two years *Himalaya* was employed in the Pacific under this particular arrangement. During this time she was engaged in a triangular system of voyages, taking lumber from west coast mills to Australia, loading coal at Newcastle, New South Wales, for Honolulu and returning to San Francisco with sugar. On 10 July 1898 she arrived at San Francisco from Honolulu; on 22 July 1899 she again arrived at San Francisco, for Hawaii, and one year later to the day in 1900 she arrived off the Golden Gate with thirty-thousand bags of sugar from Honolulu under Captain Dearborn after a passage of well over three weeks. Annexation of the Hawaiian Islands in 1900 brought numerous steel and iron square-riggers under the American flag and *Himalaya* became an American bark.

J. J. Moore sold her by auction at the Marine Exchange for $18,000 to the Alaska Packers Association of San Francisco, who enrolled her at the custom house three days after her purchase on 26 March 1902. At the time she was under charter to the Association for $800 per month for a year. Captain Thomas A. Thomsen was registered as the first captain under the new ownership. *Himalaya* was one of several similar iron sailing ships purchased at that time by the Association as the beginning of a program to replace their wooden ships with iron and steel vessels. Two more of these early purchases were the iron barks *Coalinga* and *Euterpe,* which completed a trio of the smallest and oldest ships in the iron and steel fleet, all three being well over thirty years old by this time.

Himalaya went to the Alaska Packers yard in Alameda for a few days and had two steam pumps installed before going to the loading dock to load for Alaska. On 3 April she began loading cannery supplies, sailing for the Wrangell cannery station on the sixteenth. Arriving thirty-two days later, *Himalaya* lay idle during the rest of the summer until 29 August, when the pack was stowed aboard and sail set for the voyage to San Francisco. This was completed in twenty-seven days and *Himalaya* was sent to the company yard for conversion and outfitting for the Alaska cannery work.

Major alterations included lengthening the poop to accommodate thirty-nine fishermen, in addition to rebuilding the forward house and fitting out the forward end of it as a foc's'le for twenty men. Space in the half-deck was converted into quarters to house forty-eight additional fishermen, making a total of a hundred and seven bunks for the men on deck serving in the capacities of fishermen and sailors. A galley for the Chinese hands was built under the topgallant foc's'le with two forty-gallon pots and one thirty-gallon pot for cooking, in addition to installing two new steel water tanks of thirty-three hundred gallons capacity each. A Number Seven Providence Capstan Windlass replaced the old British one and a condenser and steam pump were installed as additional improvements. Caulking the 'tween decks, renewing some plates in the bowsprit and patching around the bow accounted for the major repairs on deck, while a couple of new yards on the foremast and a new fore topgallant mast completed the work aloft.

Himalaya shifted to San Francisco to load supplies on 24 March 1903, sailing again for Wrangell in the middle of the following month. Twenty-six days later she arrived there, discharged the cannery supplies and lay idle until the end of August. Homeward bound she arrived off the Golden Gate on 24 September after a run of twenty-six days and returned to winter quarters at Alameda. The following year, 1904, saw her again making the round trip to Wrangell but a prolonged voyage of fifty-four days from San Francisco to the Alaskan port delayed her arrival until 7 June. She returned early in September after a twenty-eight day run.

By this time the bark was in her forty-first year and at an age that few of her class had been able to reach. Being actively engaged under sail required but two or three months out of the year under the Alaska Packers ownership, so it may be said that *Himalaya* had fallen into some kind of retirement. Yet she had not reached middle age. When a ship such as *Himalaya* became a salmon packer she dropped into obscurity in relation to deep-water sailing ship activities and became more of a station ship. Approximately six months out of the year was the average period of lay-up and over-haul in Alameda for the fleet; two months at sea covering both voyages to and from Alaska, and four months at anchor in Alaska constituted a year's work.

In the spring of 1905 *Himalaya* loaded for Ugashik in Bristol Bay, another Association cannery, and made the outward trip in thirty-two days. By the end of August she was off the California coast and close to the Golden Gate, arriving two days later after a creditable passage of nineteen days

from Ugashik. *Himalaya* was scheduled to return to Ugashik in 1906 but the San Francisco fire and earthquake cancelled her sailing for that year and she remained idle in the Packers' yard. The rest of the fleet had either completed their loading or made departure by 18 April and had escaped the effects of the holocaust that wrecked and burnt the city where the company offices were situated. That year her name was changed to *Star of Peru,* being similarly named to four rakish iron clippers which had once been owned by J. P. Corry & Co. of Belfast, all having names with a *Star* prefix. These four ships had been acquired about the same time as *Himalaya.*

Starting with the year 1907 *Star of Peru* was sent to Kvichak, Alaska, with unbroken regularity until 1925 when she was finally laid up. In 1908 Captain George Swanson was in command. Just prior to sailing a Third Special Survey Number Three was made of the bark and various hull plates were drilled at intervals around the waterline to determine the thickness and degree of deterioration. The northward voyage that followed was made in forty days, the ship returning in seventeen days during September bringing 30,424 cases of canned salmon. *Star of Peru* had a hundred and thirty-five men on board which was about her usual complement, although no Chinese were included that year.

During the winter of 1908-1909 *Star of Peru* had a few defective plates renewed on the starboard side of the poop and under the topgallant foc's'le. Her voyage to Kvichak the following spring took twenty-nine days. When she was off Ugashik, Alaska, she went ashore but was gotten off with little difficulty. Upon her return in the fall she went into dry-dock and although no serious damage to the bottom plates was found her cement ballast was badly cracked.

By 1917 *Star of Peru* had undergone a few more alterations in her crew accommodations and all available space not required for cargo was used for living quarters. These were arranged in the following manner: after cabin; port side, Master's room with one berth, one room with three berths, one room with two berths; starboard side, one room with two berths, one room with one berth for First Mate, and one room with two berths for Second and Third Mates. Forty-two berths in fishermen's after quarters forward of the cabin on main deck; one berth in the carpenter's shop; four berths in the room behind the galley, ten berths in the forward end of the forward house; fifty-two berths in the aft 'tween decks and twenty-two berths in the forward 'tween decks—all making a total of one hundred and forty-two. In addition to having extra boatskids on top of the two deck-houses for the large fishing boats that had to be transported

every year, it can be seen that living quarters were limited to say the least.

During the winter of 1910-1911 the Association furnished the fleet with fire-fighting equipment, and three Railway and Marine Chemical Fire Extinguishers were placed aboard *Star of Peru*. The record of severe damage by fire to the iron, steel and wooden ships is exceptional and little was experienced throughout the fleet during the thirty-six years of windjammer operation. Ice, Alaskan weather, strong currents and narrow channels combined to pick off victims from the fleet, becoming the worst enemies of the sailing ships.

Star of Peru continued to make her annual run to and from Kvichak without incident. In 1910 Captain Peder Gunderson skippered the ship and by 1912 Captain Alfred Alstrom was in command. Alstrom remained for another year, turning the ship over to Captain J. R. Barlund in the spring of 1914. Three years later Captain C. J. Bertelsen succeeded Barlund and remained with the ship until 1923, when he was relieved in turn by Captain J. DeSassise. While under Captain Barlund *Star of Peru* made her best return voyage under the Alaska Packers' houseflag of fourteen days from Kvichak to San Francisco, a distance of about twenty-four hundred miles. This included a cautious passage through Unimak Pass, a narrow channel that separates the Aleutian chain from the Alaskan Peninsula and which had claimed more than one sailing ship victim.

Star of Peru's average return from Kvichak for nineteen years was twenty-six days, her worst being forty days in 1907. Her average northbound trip to Kvichak in the spring months for the nineteen years was thirty-one days, the best being in 1923 under DeSassise taking twenty days. For the years 1908, 1911, 1918, and 1921 *Star ofPeru* was forty days on the northward voyage.

In the early part of 1921 *Star of Peru,* now in her fifty-eighth year, was given a thorough overhauling. This included a fourth Special Survey Number Three, and fifty-four holes were bored in her hull plates. From the findings of the Lloyd's surveyors, the company deemed it worth the expense to keep her in first class condition. Both she and *Star of India,* ex-*Euterpe,* were the oldest ships in the fleet, dating from the same year 1863, but had only a few more years of service ahead of them under the Association's ownership. *Star of Peru's* standing ballast was removed in order to get at the bottom and keelson. After a job of scaling, chipping and painting had been done, her ballast was replaced and work begun on rivets, frames and plates. A new jib-boom was installed and various parts of standing rigging renewed. A new chart-house was built on the poop with

a bed, desk and chart racks installed and with a stairway down into the cabin. However the wheel remained exposed and *Himalaya* could still be seen carved in the wheelbox. By the time the fleet was preparing for the coming fishing season *Star of Peru* was almost completely overhauled for indefinite Alaskan service.

On 2 May 1921 she left San Francisco for Kvichak and began the long beat toward Bristol Bay. Two days later, having worked only about 200 miles west of the Farallones, the bark encountered a squall in which she lost two topgallant masts with the topgallant and royal yards, and split three topsails and two staysails. A seaman named Oscar Anderson was lost with the topgallant masts. Captain Bertelsen changed course for San Francisco, and on 6 May the bark was met off the Heads by the tug *Sea Eagle* and towed to China Basin. In six days she was repaired and at sea again, and she arrived at Kvichak on 11 June. *Star of Peru* was unlucky again on her northbound trip in 1925, losing her fore-topmast the first day out. Again she returned to San Francisco for quick repairs, sailing again only six days after first setting forth.

The decade of the 1920's was a bad one for sailing ships in general throughout the world and its effect was felt in the Alaska Packers' fleet no less. Crews with sailing ship experience were becoming harder to find as each year began, most of them going into steam. The remaining wooden ships operated by the Association were laid up and sold in the early 1920's followed shortly by the smallest of the iron ships. Then with the purchase of the first large steamer in 1925 the advantages of operation, carrying capacity and manning of these ships over sailing ships soon became apparent and a couple of more steamers were obtained to replace the sailing fleet. *Star of Peru* made three voyages under Captain DeSassise and was finally laid up in the fall of 1925 after returning to San Francisco from Naknek in ballast.

Along with *Star of Peru,* went *Star of India, Star of Chile, Star of Russia,* and *Star of Italy.* Within five short years the entire fleet of windjammers large and small that remained were placed in permanent retirement. By the end of the next decade all were gone save one.

One day in the summer of 1926 the Alaska Packers first hauled down their houseflag, then the Stars and Stripes, as *Star of Peru* terminated a quarter of a century as a salmon packer. One more ocean voyage was in store for her under the French flag, the bark having been sold through Burns, Philp & Co. to owners in Noumea, New Caledonia. A native crew arrived in the Bay area from the South Pacific islands to work *Star of Peru*

under the command of a French captain named Leon Chateauvieux, who had spent some years in the French bounty-ship *Desaix*. Again the old bark's name was changed, this time to *Bougainville*. Several years before the bearded male figure-head had been removed to adorn one of the large buildings in the Alaska Packers' yard at Alameda, where it still remains.

Toward the end of August 1926 the bark towed down the Oakland Estuary for the last time and anchored in San Francisco Bay. On 30 August she was taken in tow for the voyage to Vancouver, British Columbia, by the steam schooner *Viking*. Only a few hours out bad weather was encountered in which *Bougainville* suddenly found herself to be free from the steam schooner, her port chain, to which the hawser was secured, having parted. After an unsuccessful attempt to pass another line, in which the bark carried away a section of the *Viking's* rail, *Bougainville's* crew made sail and managed to return to the Bay, where she anchored until 2 September. Again she was taken in tow, arriving at Port Angeles on 6 September and at Vancouver the following day.

A full cargo of lumber was loaded, part of which was consigned to Burns, Philp & Co. at Suva, Fiji, and the balance to Noumea. At Vancouver also two passengers joined the ship, signing the articles as 'midshipmen.' They were Viola Irene Cooper and Jean Schoen, two San Francisco stenographers. Miss Cooper published an account of the voyage under the title *Windjamming to Fiji* (New York, 1929).

Sailing from Vancouver on 20 September, *Bougainville* took her departure off Tatoosh Island three days later. She arrived at Suva on 4 November after a leisurely voyage of forty-two days, and two weeks later began her last trip under sail. On 23 November she dropped anchor at Noumea, New Caledonia, and was turned over to her new owners for conversion to a barge.

In 1929 *Bougainville* was transferred to Comptoirs Francais des Nouvelles Hebrides, but remained in Noumea where she continued to serve in the capacity of a copra hulk. In the late 1930's she dropped from *Lloyd's Register* and was more or less lost track of until United States forces were based in the South Pacific islands during the late war.

The surrounding waters and beaches are dotted with a few ex-sailing ship hulks, a view that forbodes an ignominious end for those few that remain. The one-time French *Bonneveine* has been abandoned and covered with slag from the nickel smelters nearby. *Clan MacFarlane* is there too in company with some other old-time New Zealand traders. They had been used to transport nickel ore under tow inter-island until steamers re-

placed them even in that lowly calling. Somewhere in the vicinity the hulks of *Chillicothe* and *Tonawanda* lie rusting away, twenty years after their last comeback to the sea-lanes. One way voyages with lumber from Pacific Northwest ports to the far corners of the Southwest Pacific led them into oblivion.

At this writing *Bougainville* is permanently moored as a copra hulk along with *Star of Russia,* renamed *La Perouse,* both owned by Ballandes Co. of New Hebrides. One is moored at Port Vila and the other in the second channel of Espiritu Santo. Copra is collected in the islands by inter-island steamers and stored in the hulks until overseas steamers tie up alongside for transshipment.

Perhaps the time will come when *Bougainville* will no longer be found useful and she will be scrapped or taken to sea and sunk. Until that time her old iron hull now in its eighty-fifth year, the shell of a once fine bark that would not wear out, continues to defy the elements in this lonely corner of the world awaiting final disposition when her days of usefulness are done.

Exodus 1947

An Interim Report on the Career of the Steamer President Warfield

BY ALEXANDER CROSBY BROWN

HAD it not been for World War II, the tragically overloaded Honduran steamer *President Warfield,* which turned up at Haifa, Palestine, on 19 July 1947 escorted by a fair sized segment of the British Navy, would probably have spent a long and uneventful career steaming up and down the length of the Chesapeake in service of the Old Bay Line. As has been reported, this comparatively small coastwise steamboat, illegally renamed *Exodus 1947,* became one member of the motley immigrant fleet which attempted to transport some 4,500 would-be Jewish refugees to Palestine without benefit of visa. The press has referred to the vessel somewhat inaccurately as an ancient, former excursion steamer[1] (actually she was a year-round night boat built as late as 1928) and, on occasions when the rewrite man felt he was on his toes, as the steamship *President Garfield.*

Although back in 1840 one of the four pioneer steamboats of the Old Bay Line had been named *Jewess,* none of these recent events could have been foreseen when, on 22 August 1927, a contract was signed by President S. Davies Warfield of the Baltimore Steam Packet Company with the shipbuilding firm of Pusey and Jones Corporation of Wilmington, Delaware.[2] This specified the construction of a 320-foot, steel hull, single screw, coal burning passenger and freight steamboat of 2800 horsepower to join the white fleet plying the two hundred mile stretch between Baltimore and Norfolk. Since all boats of the line had for some time past been named after some southern state, and the states of Virginia and Maryland were already taken up, it is presumed that the vessel was to have been called *State of Florida* after an earlier *Florida* in the line. However, later on in the same year when Mr. Warfield died, it was decided to name the boat after him. This departure from traditional nomenclature, which pro-

[1] Such as *Life,* 22 September 1947, 33.

[2] Historical details hereinafter on the *Warfield's* first years have been taken without further verification from the writer's *The Old Bay Line, 1840-1940* (Richmond, 1940). Errors, if present, are accountable therefore to the earlier, or pre-war Brown.

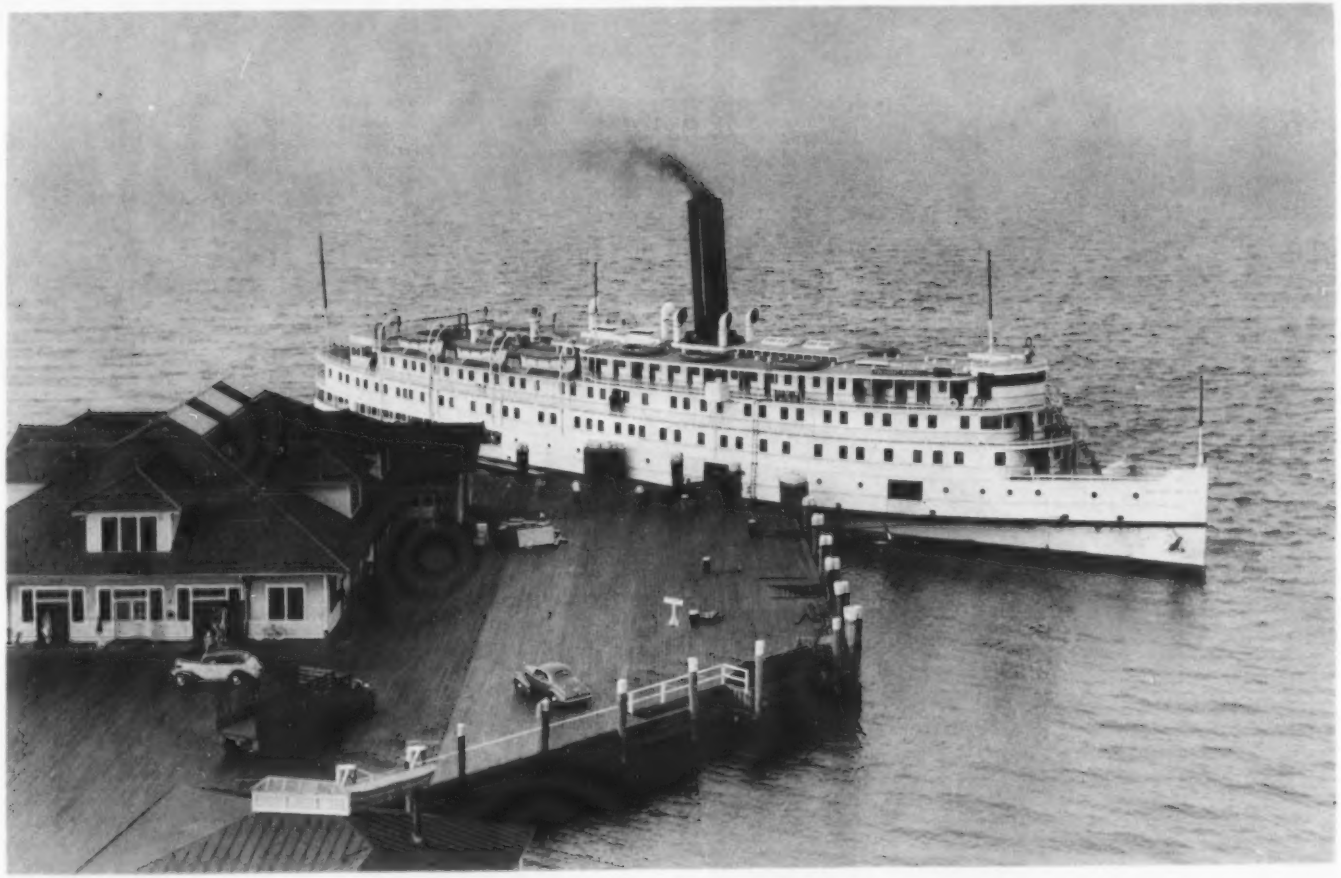
vided rewrite men with an opportunity of displaying their superior knowledge of American history, likewise occurred (and for the same reason) when the giant aircraft carrier *Franklin D. Roosevelt* was commissioned in the United States Navy in 1945.

President Warfield was launched on 6 February 1928 and Mr. Warfield's niece, Mrs. Zachary Lewis, served as sponsor. Another niece became the Duchess of Windsor. On 12 July 1928 Mr. Warfield's namesake was completed and turned over to her first master, the late Captain William C. Almy. She had cost $959,970.98.

On joining the Old Bay Line, the *Warfield* was manned by a crew of sixty-nine. She had one hundred and seventy-one staterooms with a maximum licensed capacity of three hundred passengers, some of whom, mostly soldiers and sailors, slept on chairs in the Colonial-style saloons on the trips up or down the bay. The *Warfield's* career on the Chesapeake could not have been accurately termed exciting although in early March of 1929 she received her baptism of fire when a United States Coast Guard cutter brought her to bay by firing a shot across her bow. The Coast Guard had been tipped off to a shipment of liquor and was taking no chances of bootleggers smuggling it off safely at Norfolk. But this represented the sum total of the vessel's early derelictions.

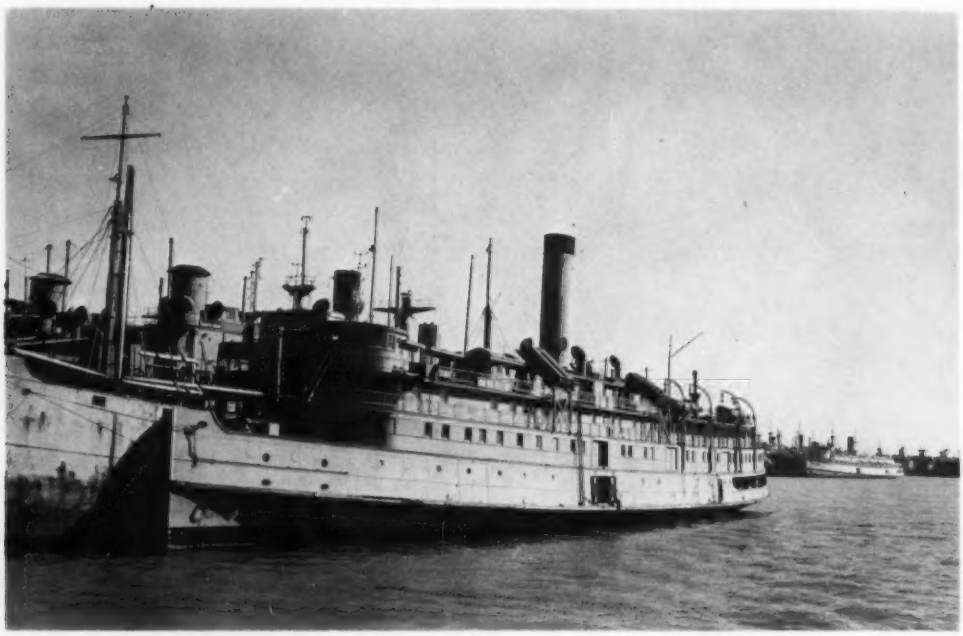
On two occasions she steamed out into the Atlantic for the trip to New York. Since the line already had two comparatively new boats, *President Warfield* spent the summers of 1930 and 1931 under profitable charter running on Long Island Sound for both the Eastern Steamship Lines and the Colonial Navigation Company, both services now defunct.

Todd oil burners replaced the *Warfield's* coal furnaces in 1933 and in 1939 her owners installed radio telephone, the first applied to an inland water steamer. The following year the Baltimore Steam Packet Company celebrated its hundredth anniversary by instituting negotiations by which it eventually absorbed its rival, the Chesapeake Line. Smooth sailing ahead seemed to be the order of the day. This tranquil state did not long persist. The British Ministry of War Transport was desperately in need of any type of craft. Accordingly, *President Warfield* was taken over by the War Shipping Administration during the summer of 1942. The vessel was readied for military duties by having her cabins ripped out and the spaces between her main and saloon decks aft and between her saloon and gallery decks forward boxed in with heavy planking; small bore armament was installed and an overall coat of gray paint applied. In company with a fleet of seven other former American shoal draft coastwise steamers and manned by a British crew, *President Warfield,* commanded by Cap-



President Warfield at the Steamboat Wharf, Old Point Comfort, Virginia, June 1939

Reproduced from a photograph taken by Alexander Crosby Brown from the roof of the Hotel Chamberlin



Moored with the Idle Fleet in the James River, October 1946
Reproduced from a photograph by Rex R. Eldridge

As 'Exodus 1947,' entering Haifa, July 1947
Reproduced from a photograph by British Admiralty

Two Chapters in the career of the Old Bay Liner *President Warfield*

tain J. R. Williams, left St. Johns, Newfoundland, in convoy RB-1 on 21 September 1943.[3] Four days out and about eight hundred miles west of Iceland the U-boats found the famous 'skimming dish convoy' and began to shadow it. On the fifth day the wolf pack closed for the kill. In the morning the steamboat *Boston* was struck by two torpedoes and sank rapidly. Her sister-ship, *New York,* followed her to the bottom later on in the afternoon and the final victim was the former Chesapeake Line steamboat *Yorktown.* An escort, H.M.S. *Veteran,* was also sunk.[4]

The *Warfield* was attacked but by quick helm action managed to maneuver to let a torpedo pass thirty feet away and then opened fire on the submarine with her twelve-pounder. During the melée, the convoy dispersed, and the remaining five ships made their separate ways into ports of Scotland and Ireland. Nazi propaganda minister Goebbels gloated that his submarines had won a 'fierce battle' and sunk several troop-laden ships of the '*Queen Mary* class.' Berlin Radio paid an unwitting tribute to the courage and determination of the crews of the little vessels by stating, 'The defense was so fierce that it could not be observed whether two or more of the transports hit sank or not.' King George presented well-merited decorations to masters and chief engineers of the surviving ships and there were posthumous awards for gallantry as well.

The next few months of the *Warfield's* career were uneventfully spent at moorings off the little English town of Instow on the Torridge River where, fast in the mud at low tide, she served as a Combined Operations training and barracks ship.[5] The United States Navy took her back from the British in July 1943 and she became U. S. S. *President Warfield* (IX-169). She then began her pre-Normandy invasion rôle of assault boat training base. In April 1944 she moved on to Barry Roads and in the comparative calm of D-plus-30 day, she crossed the Channel to Omaha Beach where she served as a station and accommodation ship for harbor control. She went back to the United Kingdom on 13 November 1944. After a stretch of temporary duty running on the Seine, she ultimately recrossed the Atlantic to Hampton Roads where she was berthed at the Naval Operating Base at Norfolk on 25 July 1945, being decommissioned and offered for sale by the Maritime Commission on 19 September. She was then towed up the James to the idle fleet anchorage to await a prospective

[3] This was not, as originally reported, a so-called 'decoy convoy' designed as bait to distract the U-boats' attention from juicy assault forces troop convoys. Washington *Sunday Star,* 20 May 1945.

[4] Anon., 'They called it the "Honeymoon Fleet" Convoy' and Captain W. P. Boylan, 'Affidavit—Loss of the *Yorktown,*' *Sea Breezes,* May 1946, 299-301 and 302-304. Recounted in F. O. Braynard, *Lives of the Liners* (New York, 1947), 188-195.

[5] A. C. Hardy, 'More Reminiscences of the "Honeymoon Fleet,"' *Sea Breezes,* December 1946, 402-405.

purchaser. Her former owners did not want her back in the face of the major and expensive overhaul which would have been necessary to reconvert her to their passenger service and she was accordingly sold on an unrestricted basis to the Potomac Shipwrecking Company of Washington for $8,028.

It is said that this company turned a tidy profit by selling her two days later for $40,000 to a concern that called itself the Weston Trading Company of New York. Actually this was a 'front' for Haganah, the Palestine underground organization, and it developed later that the ship had been paid for by sympathizers of the Zionist movement in Baltimore.[6]

Including the purchase price, it was reported that between $125,000 and $130,000 were spent on outfitting and repairs. Around the Baltimore water front the first rumors were that *President Warfield* was bound for China. Flying the flag of Honduras in whose registry she had been conveniently enrolled, she headed down the Patapsco River in mid-February 1947. Again eastbound across the Atlantic, *President Warfield* ran into very heavy weather seventy-five miles east of Diamond Shoals and started some seams. Leaking badly, the ship radioed distress signals, the tanker *H. C. Sinclair* stood by, and the Coast Guard sent the cutter *Cherokee* to assist the steamer it had once fired on. Damage and flooding were restricted to the forehold, and once the weather moderated the ship was able to steam back to Norfolk, with a slight list and down by the head, but still at good speed. This unwelcomed spotlight increased the mystery surrounding her attempted departure. Unexpectedly returned to port, it was discovered that most of her crew were Jewish and that the cargo consisted merely of twenty-five tons of life preservers and mess kits, further confirmation of the speculation that her intended employment was shady.[7] Captain William S. Schlegel confessed that he knew nothing of the ship's ultimate destiny and that by his orders he had only planned to deliver her to Marseilles. Disgusted, he left the boat at Philadelphia where she had gone for repairs.

Again patched up, and with a new skipper, *President Warfield* slipped away two weeks later and this time she made it across. Jewish immigrants secretly boarded her at the French port of Sette in early July and the now heavily laden steamer headed eastward for the Promised Land. On the second day out a British destroyer, which had been shadowing the *Warfield* at the respectful distance of two miles, pulled alongside and inquired if any illegal immigrants for Palestine were on board. Since there were

[6] AP dispatch, Baltimore, 2 August 1947.

[7] George Horne, 'Palestine-Bound Mystery Ship, Battered by Sea, is back in Port, *New York Times*, 7 March 1947.

some 4,500 of them and the steamer was almost literally bursting at the seams, this question was obviously rhetorical. But it was posed again on the next day and on the day following, but always ignored by the *Warfield's* company, who elected to answer it by playing 'Pomp and Circumstance' at the destroyer over the public address system.[8] By the sixth day, with the territorial waters of Palestine just under the horizon, the *Warfield's* unwanted escort had been augmented to consist of H. M. Cruiser *Ajax*, five destroyers and two minesweepers. A final plea from *Ajax* to give it all up was unheeded.[9]

Early on the eighth day two destroyers closed not too gently on either side of the *Warfield*. Repelled at first by a spirited defense of tin cans, sticks and potatoes, the British boarders cleared the decks with tear gas, jumped aboard and the ship was theirs.[10] With a gash on her port side, the Royal Navy convoyed her submissively into Haifa and her unfortunate passengers were transferred to three 'prison ships' for the long and sad retracing of the fruitless journey which terminated at Hamburg on 7 September 1947, some two months after their 'odyssey of frustration' had begun.

As of the end of 1947, *President Warfield* herself was still at Haifa. Meanwhile a not inconsiderable fleet of captured blockade runners had joined her there and an advertisement for the sale of vessels seized for attempted illegal entry was placed in the shipping journals by the Palestine Railways (Ports Authority) on 29 December 1947.[11] This described the vessels offered in general terms as comprising 'wooden auxiliary-engined schooners of about 150 tons gross to iron and steel steamships of six to seven hundred tons gross and one iron steamship of over four thousand tons gross. The condition of the ships varies; some are reasonably good, others are of scrap value only.'

The *Warfield* was pretty well banged up topsides during her altercation with the British destroyers. But, presumably, her hull is still sound. It is not beyond the realm of possibility that she will again cheat the shipwreckers and go on to further adventures.

[8] Warner Twyford, '[Abbott] Lutz, Veteran of the *Exodus* is Home Again,' Norfolk *Virginian-Pilot*, 18 November 1947.

[9] Anon., '*Warfield's* Epic Cruise: Passenger narrates odyssey of Jewish Refugee Ship,' *The Sun*, Baltimore, Sunday, 7 September 1947.

[10] *Life*, 22 September 1947, 33, reported that of 4,554 immigrants on board, 3 were killed and 217 injured. See also *Illustrated London News*, 26 July 1947, 95.

[11] *Syren and Shipping*, 21 January 1948, 191.

Early Great Lakes Steamboats

Warships and Iron Hulls

1841-1846

BY H. A. MUSHAM

THE presence of H.M.S. *Minos* and *Toronto* at Chippewa on Niagara continued to worry the Federal Government. Webster's efforts to secure British compliance with the Rush-Bagot agreement met with rebuff. He was informed that the Canadian provinces were still threatened with incursions of armed vessels from the United States, and the vessels there and on Lake Ontario were to guard them against hostile attack. Concerning these ships, the Buffalo *Commercial Advertiser* reported early in July 1841,

> both the British armed steamships are now at Chippewa ready for service. The *Toronto* passed down the Niagara on Thursday last, and the *Minos,* with the sanguinary symbol of St. George flying at the main gaff, yesterday afternoon. The former is the old *General Porter,* remodeled and of little account, but the latter is a staunch new craft that would be an ugly customer in case of hostilities between ourselves and the Bull family.

There is little doubt that these two warships were looked on as a menace which could only be countered by a superior force. To meet it President Tyler in the fall of the year directed that one or more steamers should be constructed for the defense of the Lakes under the Act of 9 September that year. A force strong enough to handle both British ships could have been more quickly provided by hiring or purchasing two or more of the larger and faster steamers on Lake Erie and strengthening and fitting them for naval service. Commodore Blake, master of *Illinois,* had no misgivings of what could be done along this line. Said he:

> We want no navy. Commerce is building up one for the defense of the country. But we want harbors to run into for shelter in case of a storm, or for repairs. Look at this boat. In case of war, I would sweep off the upper deck, mount a battery of cannon on the lower deck, and then she would be an effective war steamer, and I would keep on the lake in spite of a fleet of British steamers.[1]

[1] *Chicago Democrat,* 25 June 1844.

However, the government's experience in hiring steamers during the late troubles had not been altogether satisfactory because of the high expense involved.[2] After due consideration of the President's instructions, Secretary of the Navy A. P. Upshur thought otherwise and concluded that but one steamer could be built within the limit of the $100,000.00 appropriated. These were years of experimentation and Upshur and the Navy Board decided to build it out of iron.[3]

[2] On 11 May 1842, Auditor Peter Hagner reported [House of Representatives, 27th Congress, 2d Session, Document No. 227] that $55,910.63 had been paid out for the use of *Oneida* and *Telegraph*, during the late troubles on Lake Ontario, and in detail as follows:

Oneida in 1838	$ 1,705.00	
" " 1839	18,000.00	
Additional expenses incidental to said boat in 1839	204.39	$19,909.39
Telegraph in 1838	18,920.00	
" " 1840	10,000.00	
Additional expenses incidental to said boat in 1838	293.00	
Additional expenses incidental to said boat in 1840	487.91	$29,700.91
		$49,610.30
Expenses in transporting troops and munitions of war 1838-1841 inclusive other than above	$ 6,300.33	6,300.33
		$55,910.63

[3] Iron has been used for ship fittings since the early days of its manufacture. The first iron hulled vessel is reputed to have been a boat intended for passengers, which was built on the banks of the River Foss in Yorkshire in 1777, but it was not until the process of rolling wrought iron sheets and plates was developed by Henry Cort of Gosport, England, and patented by him in 1783-1784, that its use for the frames and plating of hulls became a practicable matter. Another early iron boat was a canal lighter with a shell of iron plates, built in 1787. Another was built for use on the Severn in 1789. Other iron canal boats built about 1800 were in existence about 1812-1813. There was much prejudice against its use. The proposal of Richard Trevithick and Robert Dickenson, made in 1809, that ships be built of iron was received with derision, the objection being raised that as iron could not float, ships made of it would sink. The first completely iron-hulled vessel, as far as is known, was *Vulcan*, built in 1818, at Faskine near Glasgow. Another, *Caledonia*, was built the same year in Dundee by Messrs. Carmichael, to run on the Firth of Tay, between that port and Perth. They were followed in 1820 by *Aaron Manby* which was named for her builder. She was constructed in sections by the Horsely Iron-Works, which were sent to London and there put together in dock. In September 1821, Captain Sir James Napier, one of the owners, took charge and navigated her from London to Paris. Regardless of the successful performances of these vessels objections to iron vessels were raised that they were more easily damaged than wood and corroded easily, that enemy shot would cause more damage than to wooden ships and that the local attraction of the iron affected the compass.

The first American iron vessel was the steamboat *Codorus*, built in 1825-1827, at York, Pennsylvania, by Messrs. Davis, Gartner & Webb for service on the Susquehanna. She was 60 feet long by 9 feet wide and 3 feet deep and drew 12 inches of water. She was mounted on wheels and pulled by horses to Marietta on the river where she was launched. One or two trips were made to the headwaters of the river but her draft of 12 inches was too deep for the stream. She was taken off the river and moved over to Baltimore. After some time she was taken farther south to run on some small river. But iron could not compete with wood as a shipbuilding material because of its cost, lack of rules for its use and of competent labor to work it. But the advantages of iron over wood were too great for it to be passed over. From 1834-1840, several iron steamboats were built in this country for the southern and western rivers, likewise barges for the New York and Pennsylvania canals. The parts of five of the steamers were fabricated in England. A sheet-iron steamboat was put in operation on the Erie Canal in December 1835. She was built in Poughkeepsie and was reported to have been owned by Mr. Parmalee of that place and some gentlemen in Albany. She was propelled by an engine somewhat on the locomotive plan, acting upon a central wheel

According to Van Cleve, the first iron vessel had already appeared on the Lakes. It was *Prince of Wales,* 200 tons, built at the marine railway in Kingston by Gildersleeve and was launched in 1842, for the Honorable John Hamilton, for service on the Bay of Quinte. Her engine came out of the old *Sir James Kempt*.[4]

The iron war steamer was planned with care. Warrington, acting for the Commissioners, gathered information on iron ships, their planning, construction and costs. Naval constructor Samuel Hart, United States Navy, designed the hull and Charles W. Copeland, engineer of the West Point Foundry Association of Cold Spring, New York, the engines and boilers. Copeland was serving as Principal Engineer, United States Navy, at the time. He was assisted by Charles H. Haswell.[5] On 12 February 1842, *Niles National Register* noted that: 'Mr. Hart, the government naval architect at the Brooklyn navy yard, has been ordered to Lake Erie, for the purpose of constructing a war steamer.'

In the meantime the British had not been idle on Lake Ontario. Answering a resolution of the House of 12 April, General Scott reported to the Secretary of War on 16 April, that the British

> had laid the keel of a war steamer of 900 tons, at Kingston, last September, and had another on the stocks at the mouth of the Niagara. Both must be now ready for launching if not for service. With either, and nothing on our port to oppose, she might, in a week, capture all our private steamers and sail vessels on this lake, including the frames[6] on the stocks at Sacketts Harbor, and hold command of the lake until the end of the war.[7]

The Kingston ship was the first of the two vessels ordered by the Admiralty in 1840 for service on Lake Ontario. That at Niagara was the

forward of the machinery. She had a very sharp bow and made seven miles an hour without making a swell or washing the banks. She passed through the canal to Buffalo. If she made a trip out in Lake Erie while there, she was the first iron-hulled vessel on the Lakes. This is likely.

In 1842, four iron twin screw steam canal boats were built by Hogg & Delamater, of the Phoenix Foundry in New York City at the foot of Jane Street, for the Delaware and Raritan Canal Company, from designs furnished by John Ericsson, each 96 feet long, 24 feet wide with a depth of hold of seven feet.

[4] James Van Cleve, 'Reminiscenses of Early Sailing Vessels and Steamboats on Lake Ontario,' Manuscript in Chicago Historical Society, p. 62. Captain Van Cleve's manuscript has been drawn upon in the preparation of six earlier articles in THE AMERICAN NEPTUNE, III (1943), 333-344; V (1945), 27-42; VI (1946), 194-211; VII (1947), 42-65, 298-314; VIII (1948), 37-60. See also J. Ross Robertson, *Robertson's Landmarks of Toronto. A Collection of Historical Sketches of the Old Town of York from 1792 until 1833, and of Toronto from 1834 to 1895* (Toronto, 1896), II, 877.

[5] Haswell later became Engineer-in-chief of the Navy. Frank E. Fowle, '100th Anniversary of the First Iron Steamboat on the Great Lakes,' *Journal of the Western Society of Engineers* [Chicago], XLVIII (1943), 176.

[6] The ship of the line *New Orleans*, started at the end of the War of 1812 and still unfinished in 1842.

[7] House of Representatives, War Department. 27th Congress, 2nd Session, Document No. 225, 18 May 1842.

side-wheeler *Chief Justice Robinson,*[8] of 400 tons, building for Captain Hugh Richardson, for all-the-year-round service between Toronto and Niagara, and in some respects after his own model. She had an enormous cutwater, a rostrum or beak not unlike a double furrowed plough which projected about ten feet forward below the main deck, at the water line. This was supposed to enable her to plow through the waves and cut her way through ice in the winter time.[9] A more impracticable form for an ice breaker can hardly be imagined. As she was strongly built it is quite likely that Richardson, staunch loyalist that he was, intended her to be used as a steam ram had war come over the McLeod affair. As such she could easily have sunk the American steamers and sailing craft on the lake with her ram bow. If that is the case, she was the first steam ram to be built.

On 20 April, Upshur, answering a resolution of the House of the twelfth, transmitted the report of the Navy Commissioners on the progress made on the construction of steamers or other vessels for the northwestern lakes, in which they stated they had opened a correspondence with who were considered most competent on engines, boilers and fixtures for steamers of war and had received information of great value on those subjects but it was not entirely conclusive on all points. As to the use of iron for the hull, the information procured was satisfactory. They hoped they would be prepared in a few days to enter into contracts for all parts of the vessel including engines, boilers, fixtures, armament, etc.[10]

The Navy Commissioners did not advertise for bids for the construction of this war steamer, but negotiated directly with the contractors interested. On 7 May, the proposal of Stackhouse and Tomlinson of Pittsburgh for building the engines and boilers was accepted. The same firm was given the contract for the construction of the hull on 19 May. This did not please certain Ohio contractors and on 3 June, the House in a resolution introduced on 20 May by Mr. Pendleton of that State, again called for information on this vessel. Secretary Upshur replied on 3 June, with a complete report of what had been done and why it was done.[11] Upshur stated that bids were not invited and no written instructions were given to the Commissioners to that effect, but the course followed was adopted after consultation with them. The ship was to be

[8] Named for the loyalist judge who presided at the trials of a number of the Rebels and Patriots during the late war and sentenced several of them to be hanged.

[9] Henry Scadding, *Toronto of Old* (Toronto, 1878), 576.

[10] House of Representatives, Navy Depatment. 27th Congress, 2nd Session, Document No. 199, 22 April 1844.

[11] House of Representatives, Navy Department. 27th Congress, 2nd Session, Document No. 238, 7 July 1842, 1.

of iron instead of wood because he was desirous of aiding as far as he could the development and application to a new use of the immense resources of the country in that most valuable metal and because it appeared to be an object of great public interest to ascertain the practicability and utility of building vessels, at least for harbor defense, of so cheap and indestructible a material. Experiments in Europe and here, while encouraging were not perfectly satisfactory, nor numerous enough to afford any certain rules or principles for conducting such work. The undertaking was altogether new with us and a great deal depended upon it. If it were successful it would bring into extended use a metal abounding in all parts of our country and forming a most important part of our mineral wealth. If unsuccessful, it would discourage for years to come all other enterprises of like sort and repress the hopes and energies of a large number of our people engaged and interested in that industry. The undertaking was important beyond the mere value of the vessel. The object was to secure the best workmanship and material, not merely to build it at lowest cost. It was not wise to build the vessel on the borders of the lake commanded by British naval power and the seaboard was out of the question. Cincinnati and Pittsburgh were considered as the place of construction. Pittsburgh was better fitted in iron work, had the best materials, greater facilities and communication with Lake Erie by river and canal. It was not necessary to advertise for proposals. The proposals of Stackhouse and Tomlinson for the hull were as low as any others. The contract was advantageous to the government.[12]

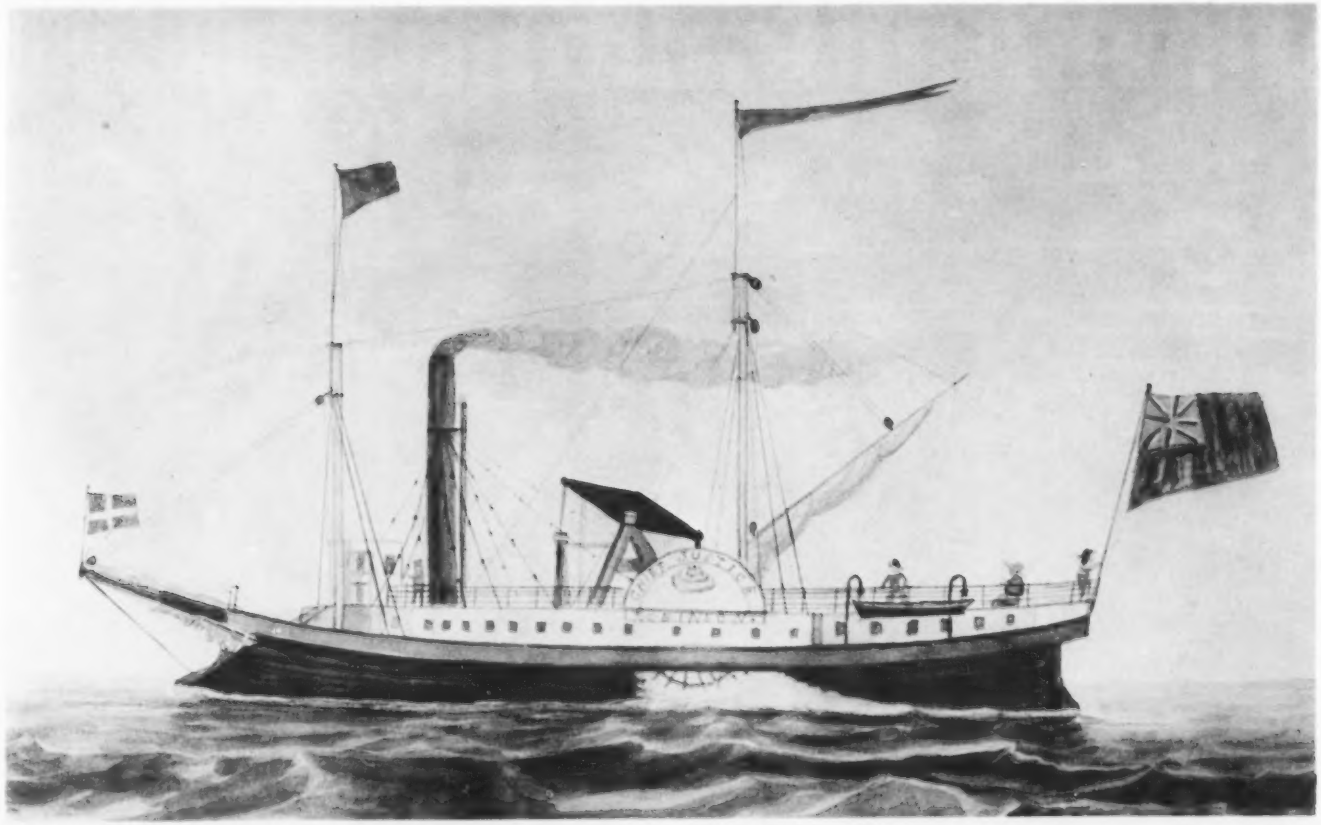
The contract price for the complete hull was 13¾ cents per pound. The hull had an estimated weight of 376,730 pounds of iron in it of which 113,557 pounds were for 699 pieces of T iron, 193,188 pounds for 880 plates and 69,965 pounds of round, square and flat iron for rivets. All were to be of the best quality American iron. The iron for the rivets was to be of extra quality, similar to that used for chain cables. All iron going into the hull was to be weighed. The Navy furnished all molds for the hull. The iron work was to be painted with two coats of red lead, one before the work was put together and the other afterward.[13]

The contract price for the engines and boilers complete and erected in place was 24 cents per pound. The patterns for them were to be made by the government and to remain its property. She was to be finished by 10 April 1843.[14]

[12] Ibid., 2. See also Herbert R. Spencer, 'The Iron Steamer,' THE AMERICAN NEPTUNE, IV (1944), 183-192.

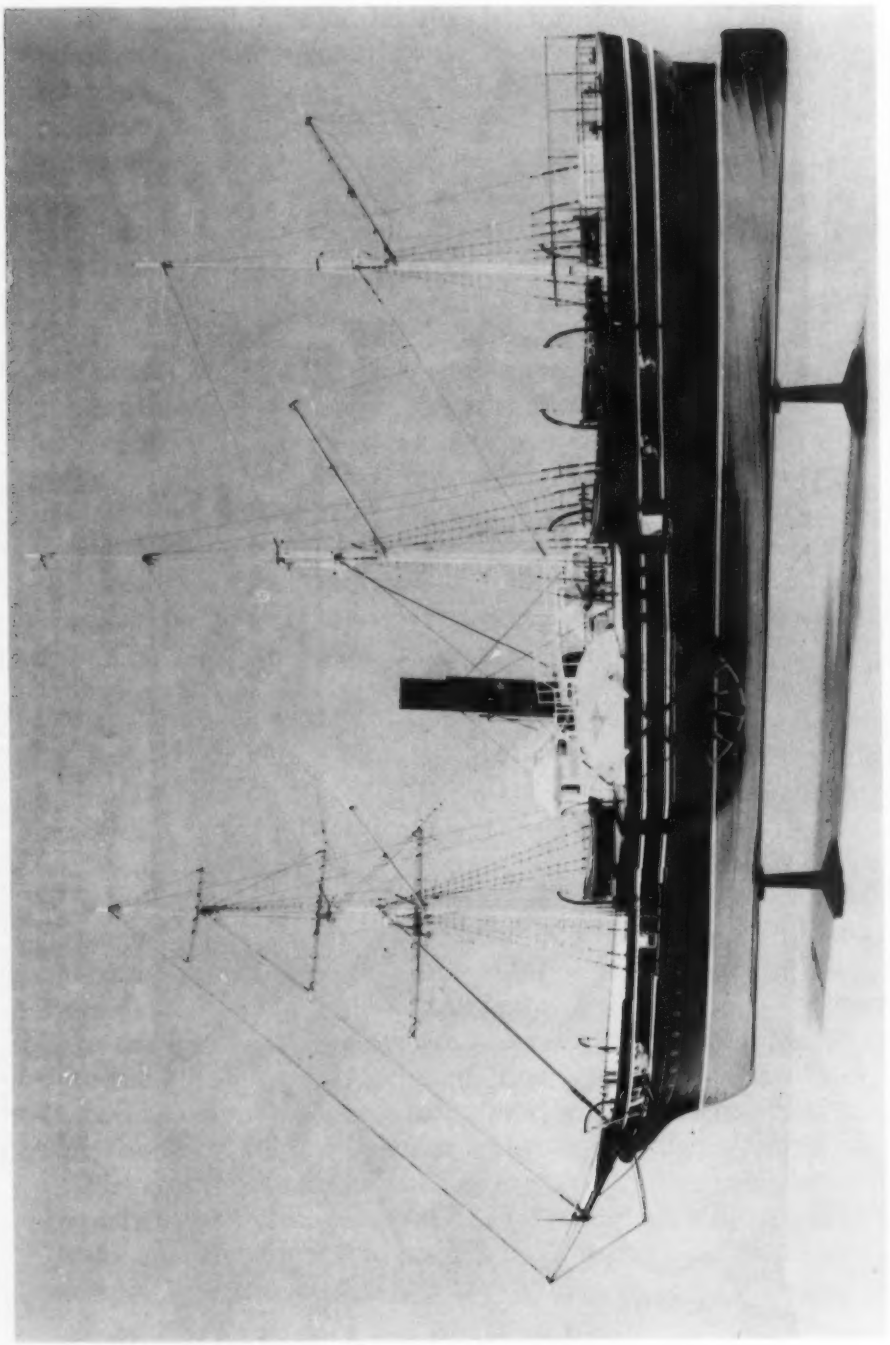
[13] Document No. 238, 14-15.

[14] Ibid., 12.



Steamboat *Chief Justice Robinson*

Painted by Captain James Van Cleve in 1843. Reproduced by permission of the Chicago Historical Society. The hull was black with a green bulwark and a red rail. The fender strake was painted red. The deck house was white. The rail around the upper deck was green. The quarter boats had black bottoms and red sides. The paddle wheels were red. The A-frame was green, the walking beam black, the cross head guides black with red tops. The steam escape pipe was black with a red top. The stem carried a long gilt scroll extending forward under the bowsprit. The paddle boxes carried gilt ornaments.



U. S. S. *Michigan*

Model in The Mariners' Museum, Newport News, Virginia, made by Robert G. C. Fee

In the meantime disturbing news came from Canada. *Niles National Register* reported on 23 July:

> we understand that a splendid war steamer to be named the *Chippewa* is now on the stocks at Kingston. Her burthen is 700 tons and she will carry two long 82's and four 32-pounders. She is being built under the superintendence of Mr. Tucker, the able naval architect by whom the building of the *Sydenham*[15] was superintended.

This report was but partial. Another vessel was being worked on in the dockyard there at the time, an iron hulled war steamer, the parts of which had been fabricated in England at Limehouse by Messrs. Fairbairn and Company, delivered at Woolwich in November of 1841, and sent out in the spring of the year.[16]

At this time, Captain W. G. Williams, Corps of Topographical Engineers, general superintendent of harbor improvements on the American side of Lake Erie, was giving serious consideration to the employment of a steamer in connection with the recently authorized Hydrographical Survey of the Northern and Northwestern Lakes.[17] The work of organization proceeded slowly. On 10 October 1842, Williams reported to Colonel J. J. Abert, Chief of his Corps, that 'the plan which experience suggests as the most economical and judicious for carrying on soundings in deep water would be by the aid of a small steamboat.' Rowboats were used at this time for this work. With a steamboat much time and labor could be saved. He continued: 'the crew of a steamboat applicable to the purpose would not consist of more than the crew of

[15] *Lord Sydenham*, ex-*Ontario*, built in 1839 at Prescott.

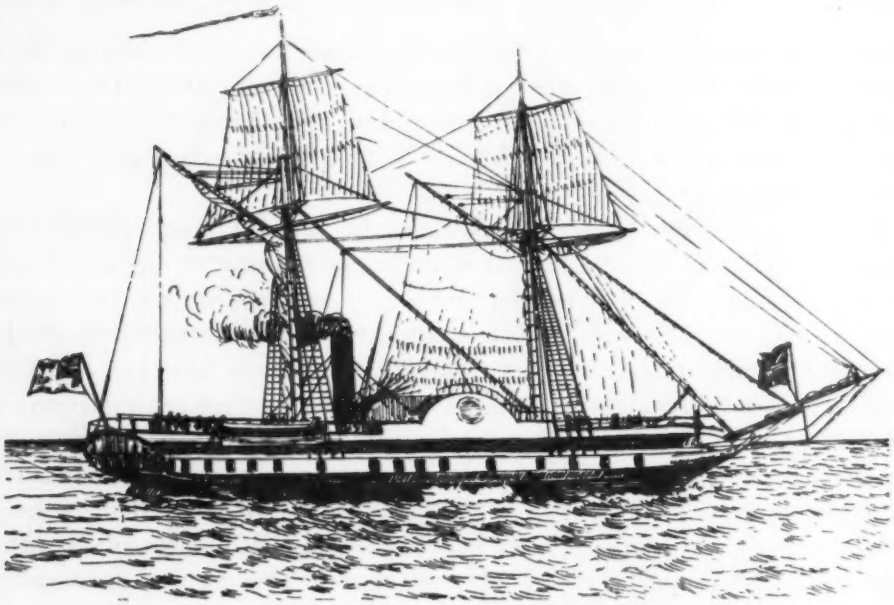
[16] Admiralty to H. A. Musham, 15 October 1946.

[17] This survey was authorized by Congress on 3 March 1841, for the purpose of furnishing charts to Lake navigators and of determining works of improvement necessary to the prosperity of Lake commerce. Captain Williams established the first office at Buffalo on 17 May of that year.

While numerous maps of the Lakes had been published, none were of much use for navigation. The Admiralty had given serious consideration to the matter soon after the War of 1812 when Captain W. F. Owen, R.N., was assigned to survey the Canadian shores of the St. Lawrence and Lakes Ontario and Erie. These surveys were made in 1817-1818. Owen's assistant in this work was Lieutenant Henry Wolsey Bayfield, R.N., who carried on the work on his relief. Bayfield surveyed the shores of Lake Huron in 1819-1822, and those of Lake Superior in 1823 and 1825. Charts based on these surveys were published by the Admiralty in 1828. They were good charts but were not complete as to details. They did not show deep water soundings or the locations of shoals and reefs. They were most likely made for naval and military purposes, especially those of Lakes Huron and Superior as Canadian commerce on those waters was slight. They were hard to secure, their circulation being restricted to official circles. Consequently they were not in general use by Lakes shipping.

As far as the Americans were concerned the Lakes were chartless. Safe navigation depended upon the personal knowledge and skill of the captains and sailing masters, gained only by long experience on these waters. Groundings were common and the losses, particularly those of sailing craft, were many and heavy. The local papers printed numerous accounts and long lists of these accidents and disasters, especially those caused by the heavy storms of the spring and fall. They harped continually on the lack of charts, harbors and safeguards to navigation and urged Congress to provide for them. To remedy the serious lack of accurate charts Congress authorized the establishment of this survey and appropriated $15,000.00 to initiate it. This was the beginning of the United States Lake Survey.

a rowboat and the expense of fuel would be inconsiderable.' He concluded by submitting an estimate of $10,000.00, for the cost of a steamboat fully equipped, which was approved by Abert and recommended to Congress.[18]



H. M. S. *Cherokee*
Reproduced by permission of the Toronto Public Library, from the John Ross Robertson Collection.

The steam frigate building at Kingston was launched on 22 September and named *Cherokee*. She was a wooden side-wheeler with a length on gun deck of 170 feet, length of keel for tonnage of 150 feet 13¾ inches, extreme breadth of 30 feet 10 inches and a depth of hold of 16 feet 3 inches. Her tonnage was 751.[19] She carried as a figurehead a bust representing a chief of the Cherokees. As for the war steamer building at Pittsburgh, the frame was nearly up and a good deal of the sheathing was on.[20] More information was reported on the other war steamer building at Kingston, *Niles National Register* for 12 November stating:

[18] House of Representatives. 27th Congress, 3rd Session, Document No. 2, 1 November 1842, 286-287.

[19] Admiralty to H. A. Musham, 15 October 1946.

[20] *Chicago Express*, 4 November 1842.

the British are now putting together at Kingston, Canada, a large iron steam frigate, which was constructed in England for the lakes and sent over. It has been examined by a gentleman of skill in that line from this country and pronounced not to be equal in 'finish' or 'fitness' to the one our government is constructing at Pittsburgh under the superintendence of Capt. Hart, and which is progressing rapidly.

She was the second of the two war steamers ordered in 1840.

In February 1843, news from Pittsburgh stated:

that the work on the iron steamship now in course of erection at that place, is progressing rapidly. The engines, two of low pressure, are also under equal progress, the work on which is said to be 'unequaled in elegance and complete finish by anything ever turned out on Western waters.'[21]

The United States Treasury Department was now giving considerable attention to the Lakes, for smuggling was a common activity of certain gentry on both sides of the northern frontier. The Detroit, Niagara and St. Lawrence sectors,—the last named particularly in the reaches of the Thousand Islands,—were ideal for this nefarious practice. The United States Revenue Marine of the Department had but one cutter on the Lakes, *Erie,* a sloop of 60 tons.[22] Steamers had not been used for this service as yet and the Department was considering their employment in its work as well as the use of iron for their hulls. It was estimated a suitable steam wooden cutter would cost $47,250.00, with maintenance over a twelve year period of $15,000.00, a total of $62,250.00, while one with an iron hull would cost but $50,000.00.[23] In 1845, the Department finally decided to build six steam iron cutters, two for the Lakes and four for the Atlantic and Gulf Coasts, where smuggling was far worse than on the Lakes.

Lieutenant Hunter was a very energetic and persuasive officer. Not only had he succeeded in having the Navy build a full size *Germ,*[24] but he had also convinced the Treasury Department that it should install his wheels on three of these cutters. Ericsson's wheels were to be used on the other three. Hunter had further convinced the Topographical Engineers of the suitability of his invention for a survey steamer for the Lakes. On 8 January 1843, Colonel J. J. Abert, Chief of the Corps, contracted with him for furnishing and delivery at the harbor of Buffalo during the spring of 1844, or sooner, an iron steam vessel to be 95 feet in length,

[21] *Niles National Register,* LXIII (1842-1843), 416.

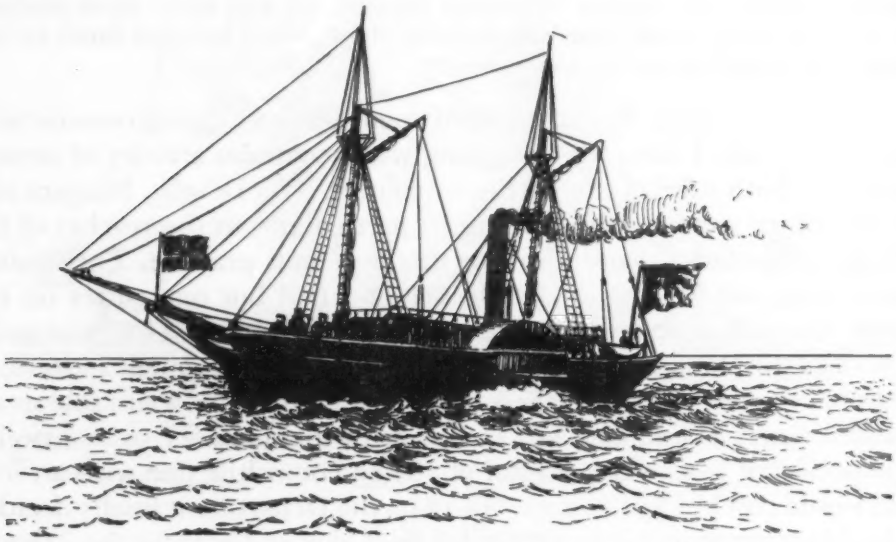
[22] H. A. Musham, 'Early Great Lakes Steamboats, Westward Ho! and Flush Times, 1831-1837,' THE AMERICAN NEPTUNE, VII (1947), 48.

[23] House of Representatives, Treasury Department. 28th Congress, 1st Session, Document No. 45, 13 January 1844.

[24] U. S. S. *Union,* built at Philadelphia in 1842, length 184.6 feet, breadth 33.6 feet, depth 17 feet, tonnage 956, 300 horsepower.

18 feet 4 inches in breadth and to have a depth of hold of 7 feet 6 inches, for the sum of $25,000.00.[25]

The iron frigate building at Kingston was launched on 21 February 1843. She was a paddle steamer with a length on the gun deck of 99 feet 1½ inches, length of keel for tonnage 86 feet 7/8 inch, extreme breadth 19 feet 6 inches and a depth in hold of 9 feet 10 inches. The tonnage was 174. She was named *Mohawk* and carried as figure-head the bust of a chief of that tribe.[26]



H. M. S. *Mohawk*
The first iron hulled warship on the Great Lakes. Reproduced by permission of the Toronto Public Library, from the John Ross Robertson Collection.

On the twenty-eighth of that month, the Treasury Department contracted with Messrs. Freeman, Knapp & Company of Pittsburgh for the construction of two iron steamers, one to be fitted with an Ericsson wheel. Payment was to be made on a net weight basis after the iron was wrought and fitted into place. Another iron revenue cutter, this one for service on Lake Erie and to be fitted with Hunter's wheels, was ordered by the Department on 18 April, of Stillman, Allen & Co., the Novelty Iron Works of New York City. All this activity in iron shipbuilding attracted considerable attention in the press of the day. *Niles National Register* reported on 10 June, that:

[25] House of Representatives. 28th Congress, 1st Session, Document No. 42, 13 January 1843, 44.
[26] Admiralty to H. A. Musham, 15 October 1946.

three iron steamers, and their engines are being built at Pittsburgh of the best material and workmanship. Two are intended for Revenue Cutters, one for the Gulf of Mexico and the other for Lake Ontario. The third, a beautiful model as she stands on the stocks, will be ready in two or three weeks to be taken to pieces and transported to her destined element at Erie. She is destined for the Upper lakes.

The hull of the iron war steamer building at Pittsburgh having been assembled to the satisfaction of Captain Hart and the engines and boilers set up and tested by Mr. Copeland, they were taken down and shipped mainly by wagon to the Naval Station at Erie, the heavier pieces going by Canal. The cost of transportation is said to have been $6,000.00. At Erie the hull was erected according to standard coastal practice, stern to the water. Dimensions and other characteristics of the hull were:

Length of keel	156.0 feet
Length on deck	167.5 "
Length over all	176.5 "
Breadth of beam to outside of plating	27.0 "
Extreme breadth of outside of paddle boxes	45.83 "
Depth of hold	12.0 "
Height from top of keel to top of rail	17.83 "
Estimated draft fully equipped for service	8.5 "
Tons per inch at light draft	8 tons, 709 lbs.
Tons per inch at load draft	9 tons, 1167 lbs.
Tonnage by measurement	500 tons

The hull was framed on the transverse system with frames spaced 24 inches center to center. Amidships they were 4-inch by 4½-inch by ⅜-inch T irons. Forward and aft they were angle irons. The keel was of the box type and was 4 inches deep. The center line keelson also of the box type, as were the side keelsons, was 17 inches deep and 12 inches wide. The latter, two to a side, were of same width and 24 inches deep. All were built up out of ⅝-inch plates. The sheel strakes were 23 inches wide and clinker laid. On the bottom and forward they were ⅜ inch thick and $\frac{5}{16}$ inch elsewhere. The berth deck and paddle boxes were of iron, while the gun deck was of wood laid on iron beams. There were four transverse watertight bulkheads with $\frac{3}{16}$-inch plates. The weight of iron in the hull ready for launching was 236 tons.[27]

An attempt was made to launch her on the evening of 4 December, but she stuck on the ways. Said the *Erie Gazette:*[28]

[27] *Niles National Register,* LXVI (1844), 18-19. Fowle, op. cit., 178.

[28] *Chicago Democrat,* 3 January 1844.

It was no go. In order to prevent the vessel from plunging to the bottom and receiving injury, her bow, which lay from the water, was dropped so low she could not move. On Thursday, it was raised, and she slipped into her destined element gracefully, and without receiving any injury.

She was lined before and after launching and did not alter her shape at all, and she was perfectly free from leak. She was a beautiful model for a good sea boat and a fast sailer, and was much admired for her perfect symmetry and clean lines. In strength she was supposed to be fully equal to the largest frigate. She was pierced for twelve guns, 32-pounders, with two 68-pound Paixhan guns on pivots, upon the quarter-deck and forecastle. This made her broadside equal to that of a vessel mounting sixteen guns, but her armament was to be limited to four 32-pound carronades and the two Paixhan 68's. This report continued: 'this magnificent vessel will probably be ready for service on the opening of navigation next Spring, her Commander and principal officers having arrived at this station.'[29]

The fitting out took all winter and the spring. Two inclined, low pressure engines with a total horsepower of 170 were installed. The cylinders had a diameter of 3 feet, a stroke of 8 feet and worked at a pressure of 20 pounds per square inch. Each engine turned a radial paddle-wheel 23 feet in diameter with double paddles 8 feet wide. The shafts and crank were of wrought iron and in part made from the rivet hole punchings. She was fitted with a steam whistle, one of the first on the Lakes. She was rigged as a bark.[30] Her spars had the following lengths:

Fore yard	66	feet
Topsail yard	50	feet
Topgallant	30.5	feet
Height of main mast to truck	83	feet
Length, forward end of jib boom to after end of spanker boom	223	feet

The report concluded that: 'much credit was due to the architects, Messrs. Hart & Son, and the contractors, Messrs. Stackhouse and Tomlinson, for their good management, taste and genius in the construction of the vessel.'[31] She was not named at her attempted launching, but was given the name *Michigan* sometime in the spring.

Construction of the revenue cutter for the Lakes proceeded at a slower rate than that of the war steamer. She was reported early in September

[29] *Niles National Register*, LXVI (1844), 18-19.

[30] Should be barkentine. The term bark was used for barkentines on the lakes.

[31] *Niles National Register*, LXVI (1844), 18-19.

to be in a forward state, nearly ready to launch and ready for service in a very short time.[32] This report was too hopeful as the *Oswego Palladium* for 29 November reported that she was being 'set up.' But the construction of the iron survey steamer designed by Lieutenant Hunter proceeded without undue delay. Under his superintendence the hull was fitted together at Cold Spring, New York, taken down and the pieces shipped via the Hudson and the Erie Canal to Buffalo where she was promptly 'put up.' She was launched on 21 December with machinery in place and christened *Colonel Abert*. She was 97 feet long, 18 feet 6 inches wide, 8 feet deep in the hold and drew 3 feet 2 inches forward and 3 feet 6 inches aft. The frames were T irons spaced 24 inches. She had two high pressure engines of 25 horsepower. Each had a cylinder diameter of 16 inches and a stroke of 40 inches. They were also built at Cold Spring. Each drove a Hunter wheel 8 feet in diameter and 22 inches deep with paddles 10 inches wide.[33] Her first trip was made on 24 January, on which she made 4.5 miles in 22 minutes, a speed of 12.5 miles an hour, with the engines making but 53 revolutions per minute on a steam pressure of 30 pounds.[34] She went out on an experimental excursion in March, preparatory to delivery to the government. Ice prevented much of a trip but she is said to have attained twelve miles to the hour in handsome style.[35] She was a strange looking craft, nothing being visible above the deck but the smoke stack. This arrangement while it served for hydrographic surveying was not satisfactory for navigation, safety and comfort. An upper cabin was built on the deck for the use of the officers. She made her trial trip on 18 May and gave the utmost satisfaction.[36] She was then to leave for the upper lakes. Hunter was in Buffalo on 6 September and made two trips on her into the lake which were quite satisfactory to him.[37] Her first mishap occurred in the great storm of 18 to 20 October, which flooded Buffalo streets to a depth of six feet, and did tremendous damage to the city and shipping in the harbor. *Colonel Abert* was driven high and dry upon the beach near the old stone house at the foot of Beach Street, but little damage was done to her and she was gotten off.

The year 1844 was one of stress and threats of storm. A President was to be elected and the Oregon affair with its slogan, 'Fifty-four forty or fight,' became the watchword of the day. The construction of *Michigan*

[32] *Chicago Daily Journal*, 11 September 1844.

[33] *Niles National Register*, LXVI (1844), 288. *History of the Great Lakes, Illustrated* (Chicago: J. H. Beers, 1899), I, 640.

[34] *Niles National Register*, LXVI (1844), 353.

[35] Ibid., 64.

[36] *History of the Great Lakes, Illustrated*, I, 645. *Chicago Democrat*, 20 May 1844.

[37] *Chicago Daily Journal*, 11 September 1844.

carried on openly at Pittsburgh, Erie, and that of the revenue cutter at Oswego so widely commented on in the press, could not have failed to attract the attention of the British in Canada. Notwithstanding that they had *Cherokee* and *Mohawk* on Lake Ontario and *Minos* at Chippewa, their government on 23 July, as *Michigan* was nearing completion, informed Secretary of State Calhoun through Minister Pakenham at Washington, that the naval force of the United States on Lakes Ontario, Erie and Huron, exceeded that allowed by the agreement of 1817. It was stated that while it was true that Great Britain did maintain in her own defense, not long ago while Her Majesty's Canadian dominions were threatened with invasion from parties unlawfully organized within the United States, a naval force exceeding the amount stipulated in the agreement, explanation was given of the necessity of that departure from it which appeared to satisfy the government of the United States, and when a change in the attitude and disposition of the people on the frontier was sufficiently evident to enable the British government to feel security against aggression, this force was reduced to the limit prescribed by the agreement. It was by all means desirable that it should be fulfilled to the letter by the contracting parties. Pakenham further stated that he had noticed an advertisement that proposals would be received at the Bureau of Ordnance for the supply of a quantity of cannon, shot and shells for the United States, of which a proportion, including a number of 32-pounder chambered guns, was to be delivered at certain places on the Lakes and that the agreement provided that armament used on the vessels of limited tonnage allowed by it were to be 18-pound cannon. The letter concluded: 'this circumstance, I am sure, will appear to you, sir, still further to justify the desire of Her Majesty's Government to receive satisfactory explanations of United States Government with reference to the fulfillment of the Agreement of 1817.'[38] This communication was referred to Secretary of the Navy J. Y. Mason, who took steps to ascertain whether the British government had any iron steamers on the Lakes. He further ordered Commander Inman of *Michigan* not to take his ship out of Erie until he should receive further orders.

The British protest, for that is what it was, was not altogether correct in its details. There was no American public armed vessel on the Lakes other than *Michigan,* while there were three British war steamers, one of them iron, and two armed steamers. On 17 August, Passed Midshipman Dillaplain R. Lambert wrote Mason from Rochester:

[38] James Morton Callahan, *The Neutrality of the American Lakes and Anglo-American Relations* (Baltimore, 1898), 126.

I went to Kingston (U.C.) as a citizen to learn facts. I find at Kingston they have a steamer *Cherokee* of about 600 tons already launched, machinery on board, and can be fitted for service in about twelve days—and can mount from 16 to 24 guns—built of wood. I learned that they have an iron steamer *Mohawk* at Toronto in commission, and commanded by Commodore Fowell, R.N., and can mount 4 to 6 guns. They also have a schooner called *Montreal* commanded by Lt. Tyson, R.N., cruising—all the above on Lake Ontario. On the Upper Lakes they have two vessels—the *Minos,* an iron steamer,[39] and the schooner *Experiment,* both commanded by officers of the Royal Navy.[40]

Mason checked this report with the list of the Royal Navy published by authority of the Admiralty and found that these ships were listed as mounting one gun each. His reports were forwarded to Calhoun with the suggestion that changes from sail to steam since 1817 would justify a revision in the agreement, and that if it be considered that the British are not inconsistent with the agreement by reason of armament being limited to one gun each, then that of *Michigan* can be similarly reduced. As for the supply of cannon, shot and shells advertised for, there was nothing unusual about it, as those for the Lakes did not exceed the proportion allotted to the northern frontier in former years. All this information was transmitted to Pakenham. The British government appeared to be satisfied to let the situation remain as it was.[41]

The armament of *Michigan* was reduced to one gun, a *32-pound carronade.* She went out on her first trial of speed in July, and made twelve miles an hour against a strong head wind with only ten inches of steam. It was thought at the time that the wheels only needed a little more dip to increase her speed to fifteen miles per hour.[42] *Michigan* was a coal burner, one of the first on the Lakes. Her bunker capacity was 120 tons. She burned 16 tons per day with engines working continuously, at a rate of 4.3 pounds per horsepower per hour. The cost of operation for one year was $67,060.00, for pay, wear and tear including coal for four months at $6.00 per ton, and $3,000.00 for contingencies.[43]

The people along the American shore were eager to see the warship about which they had heard so much and on which they relied for the defense of the Lakes. At Chicago a committee petitioned the Secretary of the Navy on 26 June, to have her visit that city. He approved. On 30 September, the *Chicago Daily Journal* reported from Buffalo: 'This iron ves-

[39] Wood instead of iron.

[40] Callahan, op. cit., 126-127.

[41] Ibid., 127-129.

[42] *Niles National Register,* LXVI (1844), 382.

[43] House of Representatives. 28th Congress, 1st Session, Document No. 2, 5 December 1843.

sel put together at Erie for the protection of the lakes is preparing to take commission. . . . She is to leave westward in a few days, and will return here or to the Rock[44] for inspection.' She arrived at Chicago on Thursday 19 October, the same paper reporting the next day:

The U. S. Steamer *Michigan,* Capt. Inman, arrived in our river yesterday at noon. The *Michigan* left Detroit last Monday at 2½ o'clock P.M. We learn from Capt. Inman that not finding the light ship at her station, he laid to in the straits, where he was passed by the *Nile.* He overtook the *Nile* going in to the Manitous. Capt. Inman regrets the necessity of taking in coal immediately on his arrival, has prevented our citizens from visiting his vessel today. This first trip of the *Michigan* has been entirely satisfactory and has conclusively tested her merits as a sea vessel. The following is a list of her officers:

Wm. Inman, Comdr; J. P. McKinstry, David McDougal, Lieuts; Peter Christie, Surgeon; Wm. A. Bloodgood, Purser; Foxhall A. Parker, Acting Master; D. R. Lambert, Passed Midshipman; Samuel P. Carter, Jas. A. Tillotson, John Van McCollum, Midshipmen; Andrew Hebard, Chief Engineer; Wm. Scott, 1st Ass't Engineer; John K. Matthews, 2d Ass't Engineer; Thos. Dickson, 3d Ass't Engineer; William Inman, Comdr's Clerk; Robt. A. Baker, Purser's Clerk; Wm. Craig, Act. Gunner; Henry Gunning, Act. Carpenter.

Her departure was reported by the same paper on 21 October:

The U. S. Iron Steamer *Michigan,* left our river for the lower lakes last evening at 8 o'clock. Through the politeness of Capt. Inman, we were shown every part of the steamer, and as far as we are enabled to judge, can pronounce her complete.

The setting up of the revenue cutter at Oswego had proceeded more slowly. It was intended at first to make her 161 feet long by 22 feet wide, with a tonnage of 409, but these dimensions were changed, the length being reduced to 125 feet, and the breadth increased to 25 feet. The depth of hold was 11 feet. On 9 November, *Niles National Register* reported that:

this iron steamer destined for Lake Ontario, is now ready for launching at Oswego. She was constructed under contract with Charles Knapp & Co., of Pittsburgh, whence the iron was brought ready for fitting up, and superintended by John W. Copes of New York. She is in all respects an excellent and seaworthy vessel, at least as far as can be known before a trial is made, and the officers now at Oswego speak confidently that her sailing qualities will not disappoint the department. Her tonnage is about 360, customhouse measurement.

She is pierced for 26 guns, but will now only carry one large gun amidship. Her engine is one of the Ericsson model, 120 horsepower with one propeller wheel astern of 9½ feet diameter. The wheel is attached to the vessel on the same plan as the steamer *Princeton.*[45]

[44] Black Rock.

[45] U. S. S. *Princeton.*

She will carry 40 men and three or four officers including the captain. She will be well supplied with beautiful arms, carbines, boarding pikes, cutlasses, battle axes, etc., from the Springfield manufactory. Her rig will be that of a three masted schooner and will spread an enormous quantity of canvas. The accommodations for her officers and crew are in the best style of naval comfort, and we should think a berth aboard her, especially in summer, a very desirable situation. It is not intended to get her ready for sea until next spring.

She was named *Jefferson,* made her first trial trip about the middle of April, and was described as a fine iron steamer fitted with the Ericsson propeller and three masts with a fine spread of canvas. The cost was $105,013.10.[46]

The Oregon crisis was at its height this year and there was much alarm for the defense of the Lakes. It was the main subject for discussion in the newspapers of the Lakes country. On 31 May 1845, *Niles National Register* reported from the *British Whig* of Kingston:

that the dock yard at Kingston is forthwith to be put on a full establishment and an admiralty commissioner will assume the command, under whose superintendence three iron steam frigates of the largest class are to be built. Mr. Tucker, Admiralty builder, the gentleman who built the *Cherokee,* came out in the *Hibernia,* and has arrived in Kingston.

As for the other lakes, the report continued:

the *Buffalo Advertiser* says—two iron steam frigates, we learn, are soon to be commenced at Chippewa, for service on this and the upper lakes. The British government seems determined to make use of cogent arguments in conducting its negotiations.

There was much discussion along the Lakes as to how they could be best defended. Lieutenant M. F. Maury, United States Navy, writing under the pen name of Harry Bluff in a series of articles on naval reform and defense, published in the *Literary Messenger* of Richmond, and widely reprinted in the local journal, urged the establishment of forts and arsenals at strategic points, as well as a navy yard at Memphis to train navy personnel in steam engineering, and a ship canal between it and Lake Michigan by the Illinois River to move warships to and from the Lake in case of war, and much to the distress of the Buffalo papers. His suggestions were taken seriously as Commodore Morris was ordered to explore the practicability of such a canal and fix upon a suitable location for a naval station on the Lakes. He and Colonel Totten of the United States Engineers spent some time along the route of the Illinois and Michigan Canal then

[46] *Chicago Daily Journal,* 24 April 1845. *Niles National Register,* LXIX (1845-1846), 256.

under construction and in Chicago in July. They left for the East on a reconnaissance of the Lakes on the twelfth of the month. Said the *Buffalo Commercial Advertiser:* 'The distinguished and high character of these officers will give great weight to any recommendation they may make and their report will be looked for with much interest.'[47] From their report it appears that they apprehended no danger, and nothing further was done to put Maury's suggestions into effect.

On the Canadian side, H.M.S. *Cherokee,* Captain Davis, R.N., and *Mohawk,* Lieutenant Tyssen, R. N., patrolled Lake Ontario between Kingston, Toronto, Hamilton and Niagara, one being out while the other remained in port. Captain Thomas Dick was the pilot for these ships and was paid five pounds for each trip each way. He, feeling himself well compensated by the good time he had on board with the officers, distributed his fees among the crews.[48] In the early fall, the United States Revenue Cutter *Jefferson* paid a visit to Kingston. The people there thought her a very beautiful craft.[49]

The second of the two iron revenue cutters, that for Lake Erie and the Upper Lakes, *Dallas,* was a long time in construction. She was fabricated by Stillman, Allen & Co., the Novelty Iron Works of New York City, assembled there, taken down, put up at Buffalo and finally launched on 4 January 1846. She was fitted with ordinary radial side wheels instead of Hunter's wheels as intended. Otherwise she was similar in general to *Jefferson.* The cost was $82,952.23.[50] Both of these vessels were more than revenue cutters. Classing them as such was but another way around the agreement of 1817. They were in fact to be ships of war, which with *Michigan,* formed the American answer to *Cherokee, Mohawk* and *Minos.* War, however, did not come out of the Oregon crisis and revenue cutters they remained.

Prince of Wales probably, *Mohawk, Colonel Abert, Michigan, Jefferson* and *Dallas,* all built in the early forties, were the pioneer iron ships on the Lakes in the order named. The first two were Canadian and British and the others American. With the exception of the first named, they were all public vessels. The American were admittedly experiments in iron shipbuilding and two of them, *Colonel Abert* and *Jefferson,* experiments in new methods of propulsion.[51]

[47] *Chicago Democrat,* 16 July 1845. *Niles National Register,* LXVIII (1845), 357.

[48] Robertson, op. cit., II, 880.

[49] *Chicago Daily Journal,* 16 October 1845.

[50] *Niles National Register,* LXIX (1845-1846), 256.

[51] With the exception of *Jefferson,* these pioneer iron vessels were side-wheelers. *Jefferson* was originally fitted with the Ericsson wheel. Ericsson at first appeared to have a monopoly on the screw

Michigan is commonly credited with being the first iron ship on the Lakes. This, as has been clearly shown, is not the case. While her hull was the first iron hull to be launched on Lake Erie and the Upper Lakes, she was the second iron steamer on them, having been preceded in her trial trip by *Colonel Abert*. She was the fourth iron steamer on all the Lakes, but as she was the first iron ship of the United States Navy, she was the first American iron naval vessel on the Lakes. Her construction was a fine piece of shipbuilding, as was that of *Colonel Abert*. They, along with *Jefferson* and *Dallas,* speak well for the officers of the Federal Government who proposed, planned them and for the ship and engine builders who constructed them.

propeller. His success brought American inventors to the front, notably Stevens and Emerson in defense of their prior patents. Emerson sued him and won his case, *Niles National Register* for 11 January 1845, reporting: 'Ericsson's propellers. Important decision. In the United States Court setting in New York, the jury have decided the propeller of Mr. Ericsson to be an invasion of the patent of John B. Emerson, who is thus declared to be the original inventor. A verdict was given for Mr. Emerson for $3,575.00. Stated to be the largest amount of damages ever rendered in that court in a patent suit. The defendants [Hogg and Delamater] are engine builders in New York engaged largely in the manufacture of the wheel known as the Ericsson propeller.'

Stevens was just as persistent as Emerson in asserting his rights. On 22 February, *Niles National Register* reported that 'The *Princeton,* U. S. steamer, whose experiment of the Ericsson propellers was presented to be so conclusively triumphant, we see was to leave New York on the 20th for Norfolk to go into dock, and to substitute Mr. Stevens's old contrivance.' Before she entered the dock a trial of speed was run on which an average speed of twelve miles an hour was attained. [*Niles National Register,* LXVIII, 67.] When she left the dock she carried a six bladed Stevens wheel of 14.5 feet in diameter and a pitch of 32.44 feet. The blades had a width of 4.25 feet. On trial the Stevens screw proved to be 11 per cent more efficient than that of Ericsson, the speed attained being 1.33 miles per hour faster. [*Niles National Register,* LXVIII, 68. Frank M. Bennett, *The Steam Navy of the United States* (Pittsburgh, 1896), 63.]

The Ericsson propeller now fell into disfavor and was generally discarded. During the early summer the Ericsson propeller was removed from *Jefferson* and replaced by one of a type invented by Captain R. F. Loper, a four bladed wheel resembling that used on the modern steam tug. It was made in England, was 9.75 feet in diameter and weighed 4318 pounds. [*Niles National Register,* LXIX, 21.]

The Hunter wheel was another casualty. Hunter's full sized experiment, *Union* and *Allegheny,* both ships of the Navy, had proved to be too slow. It had no advantage that the screw propeller did not have. Its defects were serious. A considerable percent of the power of the engine was used up by the buckets of the radial wheels in pushing water into and thrashing it around inside the drums. The drums took up considerable space amidship and the openings in the sides weakened the hull. The wheels were taken out of several vessels in which they had been installed and it was decided not to put them in Dallas as intended. Numerous other methods of propulsion including that by jets and that by rockets were also tried, but the victor in this 'battle of the propellers,' was the simple four bladed wheel of true helicoidal form. [*Niles National Register,* LXVIII, 176, 352.]

Notes and Documents

Folklore and Anthropological Literature as a Source for Maritime Historians

In a recent article in the *New York Folklore Quarterly* III, (1947), 102-106, entitled 'The Jersey Devil and Other Legends of the Jersey Shore,' by Henry Charlton Beck, attention is called to the lack of a study of the history of maritime activity along the New Jersey coast. He mentions all too briefly such small boat types as Durham boats, garveys, and sneak boxes, and tells some amusing anecdotes of coastal sea lore. Possibly some reader of The American Neptune may know of a study of New Jersey maritime history being made which he can call to Mr. Beck's attention.

Reading the above mentioned article it occurred to me that during the past several years there have been many references in the folklore and anthropological journals of both the United States and Great Britain, which might interest some Neptune readers. *Journal of American Folklore* is a particularly fruitful source for songs and ballads relating to the sea, tales of buried treasure, phantom ships, and similar material. The various anthropological journals contain occasional contributions to the student of non-European craft. Articles describing the construction and handling of such craft together with discussions of their importance in native economy and life are frequently found.

As these sources are somewhat restricted to the professional fields of folklore and anthropology I have compiled a partial list of the periodicals likely to contain maritime material.

American Anthropologist.

Organ of the American Anthropological Association and affiliated societies. Articles of general interest and world wide distribution of subject matter.

Southwestern Journal of Anthropology.

Published by the University of New Mexico and the Laboratory of Anthropology, Santa Fe. A newcomer to the general field with subject matter similar to the above.

Journal of American Folklore.

Published by the American Folklore Society. Covers white, American negro, and American Indian folklore. Type of contents already noted.

New York Folklore Quarterly.

Published by the New York Folklore Society. Contents similar to the above journal, but restricted to New York State and adjacent areas.

Journal of the Royal Anthropological Institute.

Organ of the society whose name it bears. General material of world wide distribution.

Man.

This is also a publication of the Royal Anthropological Institute of Great Britain and Ireland. Carries shorter articles than the Journal plus notes and reviews.

Folklore: a quarterly review of myth, tradition, institutions and custom.

Published by the Folklore Society, London. Covers the Old World in the same way that the *Journal of American Folklore* covers the New World.

Antiquity.

An English journal of archaeology which frequently carries articles on Viking ships, coracles, and other types of

early European craft as well as occasional articles on modern non-European vessels.

The Journal of the Polynesian Society.

Published by the Polynesian Society, Wellington, N. Z. Carries articles on all other Pacific Oceanic regions besides Polynesia, and frequently has articles on canoes, voyages, and navigation of the natives.

Oceania.

Published by The Australian National Research Council, Sydney. Covers the same region as the above, but articles are directed more to the social and economic aspects of the region.

Mankind.

Official Journal of the Anthropological Societies of Australia, Sydney. In theory a journal of general interest but actually restricted to about the same region as the two above journals.

The Beaver.

Published by the Hudson's Bay Company, Winnipeg, Canada. This is not, strictly speaking, an anthropological journal; but as about half of its contents are of interest to students of the North American Indian, it is included here. Not only are there articles on inland water modes of travel of the natives but numerous papers on Arctic exploration, ships in Arctic service, steamboating on the MacKenzie River, etc.

This list does not, of course, include all the host of publications in this vast field. It does, however, give the principal journals in English, and indicates some sources that may not be usually considered by maritime historians.

E. S. DODGE

Speed, Size, and Model

Early *American Lloyd Registers* classify vessels according to four degrees of fineness of model: *full, medium, sharp,* and *clipper.* In my well-thumbed copy of the 1862 edition some of the highly-touted clippers have surprisingly conservative ratings; the *Great Republic* is called 'sharp,' and the *Donald McKay* 'full,' for example; and the suspicion arose either that the register descriptions are careless, or that some famous ships owed their sailing qualities more to their large size than their extreme model.

Appendix IV of Cutler's *Greyhounds of the Sea* contains the means of settling the question. Listed therein are all the voyages from the Atlantic seaboard to San Francisco between 1848 to 1860, providing a convenient yardstick for testing the speeds of various classes of vessel. The table below summarizes the result of tabulating all such voyages (573 in all) made between 1853 and 1860, inclusive, by vessels that could be identified in *American Lloyd's Register* for 1862. The 1848-1852 voyages were left out of account to eliminate runs made before Maury's *Sailing Directions* for the California trip were published, thus putting all vessels on an equal basis as regards route.

Tonnage, old measurement	Average passage in days				
	Full	*Medium*	*Sharp*	*Clipper*	*All*
Under 799	150	142	139	130	144
800-999	140	135	134	121	136
1000-1199	132	130	121	128	128
1200-1399	131	138	124	124	129
1400-1599	118	130	117	124	121
1600 and up	129	120	118	118	120
All sizes.	135	132	123	124	129

It appears from the table that the register descriptions of model were, on the average, accurate — at least in the smaller vessels; for the clippers under 1000 tons were definitely fastest, and the sharp vessels next. The suspicion that size had something to do with sailing qualities on the Cape Horn passage is borne out, however; and it is evident that the mere increase in size of vessels built for the California trade must share credit with Maury's *Sailing Directions* and the clipper models of Pook, Griffiths, McKay and Webb for shortening the time of sailing vessel passages to San Francisco after 1848.

Additional support is lent this view by the German experience. Schott[1] gives the following figures of average sailing vessel times for two runs:

Years	Lizard to Singapore, days.	Lizard to Valparaiso, days.
1870-77	123	102
1878-81	120	91
1882-86	118	88
1887-90	115	83
1893-1904	107	82

The improvement is attributed by Schott to the efforts of the Deutsche Seewarte, and to technical advances in the ships. It is probable that the later captains paid more attention to the meteorology and oceanography of their routes; but as far as technical improvements in ships is concerned, the trend, if any, was in the other direction. The later ships were steel-bottomed instead of coppered; they had fuller lines, smaller crews, and fewer light sails. Laas gives the explanation.[2] The average size of the German ship trading to South America in 1875-79 was 550 tons, net; in 1900-04 it was 2000. The average German trader to the Far East in 1875-79 measured 670 net tons; in 1900-04, 1700. That the Seewarte deserves some credit is obvious: the owner of a 2000-ton ship saw that his captain took the best route, or he hired a man that would; but it is also obvious that a good big ship can sail faster than a good little ship.

JOHN LYMAN

CONTRACT FOR BUILDING A BARK, 1880

[Document in the collection of Captain F. H. Hardy]

The following contract for the building of the bark *William W. Crapo* affords an interesting contrast with the older documents that have already been published in THE AMERICAN NEPTUNE. Instead of lengthy descriptions of scantlings, it was simply necessary to specify the classification society whose requirements had to be met. Also, fire insurance protected the party of the second part while the hull was on the stocks.

Registered dimensions of the *Crapo* were 215 x 41.8 x 24 feet, which work out to an 'old government tonnage' of about 1747, so that she cost $78,600. Commanded for many years by Captain W. W. Hardy, the bark was lost through fire, while loading for Boston at Junin, Peru, in 1894 or 1895.

— COPY —

This memorandum of agreement made and completed this seventh day of July A D 1880 between Messrs Goss, Sawyer & Packard, Shipbuilders of Bath State of Maine, parties of the first part and Capt. W H Besse of New Bedford State of Massachusetts party of the Second Part, Witnesseth:

That the said parties of the first part agree to build Launch, rig, & equip ready for sea a Bark of the following dimensions:

Two hundred feet Keel (200)

Forty one and one half feet Beam (41½)

Twenty four feet deep (24)

Keel, Frame, Beams, Keelsons, Ceiling, Planking & Fastening to be of size material and quality to satisfy the requirements of the French Lloyds of the class to rate 3/3.1.1. in Veritas for Fourteen years.

Vessel to have Iron Windlass Emerson Patent & Iron Pumps, – Capstans, Chains, Anchors, Spars, Sails, Rigging, Boats, Outfits and Workmanship to be first class and to the satisfaction of the party of the second Part –, And the parties of the first Part agree that the keel for the said vessel shall be laid during the current month of July, and that then the said party of the second part shall have a lien upon said Bark, and upon all the material intended for her construction and completion, as security for monies advanced and to be advanced by him as hereinafter provided – And that

[1] G. Schott *Geographie des Indischen und Stillen Ozeans* (Hamburg, 1935), p. 369.

[2] W. Laas, 'Entwickelung und Zukunft der grossen Segelschiffe,' *Jahrb. Schiffbautechnischen Gesellschaft* (1907), fig. 60.

said parties of the first Part will keep said Bark and said material insured by policies approved by and payable in case of loss by fire to secure said party of the second part for monies advanced. And said bark shall be launched rigged and finally completed during the current month of November at the charge and expense of said parties of the first part —, And said parties of the first part upon the entire completion of said Bark, will transfer by Bill of Sale Registry or other instrument and deliver free from incumbrance lien & lawful claim, Five Eighths (5/8) of said Bark unto said party of the Second Part. In consideration whereof the said party of the second part agrees to pay to said parties of the first part for said vessel at the rate of Forty five (45) dollars per ton old government tonnage in sums as follows:

His proportion of Ten thousand (10000) dollars when Keel is laid
His proportion of Fifteen thousand (15000) dollars when in Frame
His proportion of Fifteen thousand (15000) dollars when Cieled
His proportion of Twenty thousand (20000) dollars when Planked
Balance when ready for sea.

Signed Goss Sawyer & Packard
W H Besse

The builders guarantee that the vessel will stand up with spars aloft and sails bent & without Ballast.

Contributed by John Lyman

Life Preserving Dress

[Advertisement in *The American Beacon*, Norfolk, Virginia, 2 October 1822.]

Life Preserving Dress. Two men will be seen walking in the water as upright as if on shore in any depth of water for an unlimited time; their arms so much at liberty as to eat and drink, load and discharge pistols or guns, fencing with swords, with perfect ease; thereby showing the safety of the above dress, in case of shipwreck. Universal approbation, not only on account of so novel and singular a sight as seeing men who cannot swim, walking in the water with perfect ease, but principally of its usefulness, has been manifested by thousands of Gentlemen as well as Ladies, in New-York, Philadelphia and Baltimore. The Steamboats *Virginia* & *Norfolk*[1] are engaged to carry Passengers about 8 or 10 miles from Town on the following days:

The *Norfolk* THIS DAY
The *Virginia* on Friday and Saturday next, for the last time.
Hour of departure each day, 4 o'clock P. M.

The best Band of Music to be had in this place is provided for the entertainment of the company.

Tickets 75 cents each, Steam Boat Excursion and Music included.

N.B. To prevent delay and confusion the Public are respectfully requested to provide themselves with small change.

Contributed by Alexander Crosby Brown

[1] These Steamboats were among the earliest to navigate Chesapeake Bay. *Virginia* was built at Baltimore in 1817 and measured 136 x 24.9 x 5, 289 tons. She had a 44 horse power low pressure 'steeple' engine. She was used for many years running between Baltimore and Norfolk taking time out for excursions at each end of the bay. She ultimately became a show boat on the Hudson River renamed *Temple of the Muses*.

Norfolk was likewise built in 1817 at Norfolk. She measured 134.6 x 25.3 x 5, 222 tons, being powered by a 'steeple' engine. She was initially operated on Albermarle Sound and later joined *Virginia* in service between Norfolk and Baltimore.

Queries

86. Matthew Walker Knot. What is the origin of the name of the Matthew Walker knot? During my early days rounding Cape Horn in sail, there was a belief among the denizens of the half-deck that Matthew Walker was the author of that well-known riddle: 'Aft on the port side? For'ard on the starboard side? All round the ship?' The answer is of course, the Matthew Walker knot, but that brings us no nearer the knowledge of who Matthew Walker was, and how the knot got its name.

W. S. DAVENPORT

87. Dry-Land Terminology. Several years ago I heard the following statement by an informed person: There is an interesting reason for the use of dry-land terminology on Yukon River steamers. When traffic rapidly developed on that river is was necessary to secure at once pilots who knew how to operate on a course affected by shifting sands. The natural place to recruit them was along the Mississippi River. Most of the navigation on that river had developed from the early rafts which farmers used to move their surplus crops to market. Having no contact with the sea, the farmer-pilots carried aboard their domiciliary language — 'upstairs,' 'the stairway,' 'the back,' 'the front,' 'the porch,' etc. This terminology persisted and was carried to Alaska.

I travelled on the Yukon in the summer of 1928, before I heard the foregoing information. I paid no particular attention to the language used (except the term 'dead man,' a short beam buried in the bank at Fort Yukon and serving as a kind of anchor), but I do not recall that I heard any really nautical word. Naturally this does not certainly mean that none was used.

It would be interesting to have the story I have related scrutinized for accuracy and perhaps elaborated as a small chapter in the life history and migration of navigational terminology (a wider expression than 'nautical language').

ELDON GRIFFIN

88. Whaling Logs. I am doing research upon the period when Herman Melville was serving in whaling vessels in the South Seas (1841-1843) and am seeking log-books and journals that might possibly illuminate the period. Having already checked with most of the public depositories, I should appreciate hearing from any private collector who owns log-books or journals of whaling vessels which *sailed* between 1837 and 1842.

I should also appreciate clarification of the expression 'season-on-the-line,' frequently used in *Moby Dick*.

WILSON L. HEFLIN

89. John Rodgers. Among the bound pamphlets in the Boston Athenæum is one by John Rodgers, later Commodore, United States Navy, entitled *Appel à la loyauté de la nation francaise contre les pirateries exercées par les armateurs*. This was printed in France in 1797 when the ship *Hope* of Baltimore, of which Rodgers was then master, was taken into Lorient by privateers of that port. Information concerning present ownership of other copies of the pamphlet would be appreciated.

WALTER MUIR WHITEHILL

Book Reviews

SAMUEL ELIOT MORISON, *The Battle of the Atlantic, 1939-1943* (Boston: Little, Brown and Company, 1947). 5¾" x 8½", cloth. lx + 432 pages, 30 plates and 24 charts. Volume I of *United States Naval Operations in World War II*. $6.00.

The Battle of the Atlantic is the second volume in order of publication of Captain Morison's 'shooting history' of *United States Naval Operations in World War II*, but in the production plan it is the *first* volume chronologically and is, therefore, Volume I of the history. This volume covers the period from September 1939 to May 1943, a fact to be borne in mind when reading it, for into the space of some four hundred pages the author has packed the story (and we use that word advisedly rather than 'history') of almost *four years* of naval operations—operations of a type and on a scale far different from any previously recorded in world history. New weapons, new techniques, vast areas of the North and South Atlantic, far flung events, diverse personalities of the warring nations—all these and many other features characterized four years which took the United States Navy through two years of tense neutrality and two years of grimmest war. To crowd this story into such space acceptably is in itself a triumph—Captain Morison has done it!

With the rare combination of exceptional ability, previous experience and source material available beyond any historian's dream—the question is, what has Captain Morison brought forth? What has he done and *how* has he done it? The first part of the question may be answered briefly—he has done well, exceedingly well; in Volume I, he has produced a stirring, readable, accurate, and amazingly comprehensive work that will be essential to any study of World War II. There is no reason to believe the remaining volumes of his history will fall short of the high standard set by the two volumes that have appeared—a pleasant thought indeed to the students of history, to those who delight in a good story, and to the personnel of the United States Navy (which of course includes the Naval Reserve).

The second question—*how* has he achieved success in a difficult, involved, highly technical, highly specialized field? That calls for elaboration, and we must go to the Foreword of Volume I for a clue. In that Foreword, Secretary Forrestal says 'This work, however, is in no sense an official history. The form, style and character of the narrative are the author's own. The opinions expressed and the conclusions reached are those of Dr. Morison and of him alone' . . . and in those words we find the answer to our question. Captain Morison has *not* written a 'history' in the sense of listing events in chronological order, the whole possessing little more life than an official naval report; he has written a stirring descriptive narrative of a *battle* and quite fittingly called his work *The Battle of the Atlantic*. It is written somewhat as Victor Hugo wrote of the Battle of Waterloo; it is a story and not a textbook, for the naval operations in the Atlantic were themselves different and any account of them must differ from the standard history to portray them truly. There are

life-like, personalized sketches of the leaders, bits of sermons and moralizing by the author, opinions and deductions, vivid and informal words and phrases, conclusions and recommendations—all these breathe life and action and interest into the dry, precise, matter-of-fact naval records which are the framework of the story. This volume has been read by other reviewers who have seized upon one or more controversial points brought forth by Captain Morison and expanded upon such point (or points) without giving due credit to the real depth and value of the book; this reviewer is an officer of the Navy who knew the Navy Department and the Atlantic during 1939-1943. It is not impossible that this naval history is here, for the first time, being reviewed publicly by one of those of whom it treats.

The Battle of the Atlantic attempts to include all United States Naval operations in that ocean from pole to pole and in the Caribbean, Gulf of Mexico, Barents Sea and Atlantic territorial waters. It was a battle of sea communications—a fight for the protection of the shipping, supply and troop transport without which the war could not have been won. There were no fleet actions, no glory, no recognition—it was (for the most part) cold, nasty, miserable, dirty, wearying and unending *work*—no person who *fought* a war can ever be accused of desiring another! But the Battle of the Atlantic was second to none in its influence on the outcome of the great struggle, and the book so appropriately named tells the story by telling of representative convoys, of training schools, of technical devices and of scientific research, and gives due space and credit to the auxiliary and amateur forces which played their important parts. Captain Morison's presentation of the services of the Naval Armed Guards and the Merchant Marine is, in our opinion, oustanding for its clarity, vividness and restraint; we agree wholeheartedly with his opinion [page 300] that 'if and when another war occurs, the Merchant Marine should either be absorbed by the Navy or made an auxiliary service under military discipline.' The material on convoy and anti-submarine history is so vast that no one book can cover it, but the author has chosen his examples with professional skill and dramatic instinct—they tell the story for all. The photographs are good, the sketches helpful and easily grasped, and the tables at the end of the book of great interest. The unity of global war is at all times kept before the reader, and at various (and appropriate) times contemporaneous events in other theaters are woven into the Atlantic story to preserve a true perspective and an appreciation of political events and foreign policies. The introduction by Commodore Knox is interesting although a bit enthusiastic on the 'Navy side' and in some respects should be taken with a grain of nautical salt; we especially commend Chapters IV, X and XVII to all readers interested in naval history.

But we do not find this work entirely flawless. In our opinion, the informal phrases are a bit overdone—too many expressions such as 'out on a limb,' 'monkey business,' 'blitzed,' 'crash into the French Antilles,' 'sleeping dogs, grounded planes and anchored ships were allowed to lie,' 'the great Fall turkey shoot,' 'Hitler would swing on Russia,' 'bent on all speed,' 'Cominch playing the somewhat unwilling rôle of midwife,' 'communication system conked out,' 'put the heat on,' 'Uncle Joe sent an urgent plea.' Naval records need enlivening for narrative history, but too much informality can conceivably develop a tone more to be desired in a juvenile publication than in a serious adult work. There are too many footnotes—each is

relevant and important, but from a *reader's* viewpoint, it would be preferable to include many of the footnotes in the text. We definitely do not agree with the author's conclusions as found on page 200; it is true that the Navy *was* unprepared for U-boat war in January 1942 (and unfortunately, we are afraid, it will be *always* less than fully prepared except in the unlikely event our country plans for an aggressive war), but the Navy was prepared to the maximum with the ships and men that could be secured under then existing law. The ships it did *not* have were those that could be most easily obtained after war began; when these ships were ready the plans to use them were ready. The difficulties of anti-submarine warfare are clearly and forcefully set forth by the author at the top of page 203, and in this reference (together with page 409) we feel he has rebutted his own criticism. Not by any stretch of imagination can we believe that Congress would have authorized (much less appropriated for) a peace-time Navy which would have been fully prepared for the anti-submarine warfare that ushered in World War II for the United States.

It is also true that at one time several different systems of anti-submarine warfare were taught in various naval training centers—it was a *new* anti-submarine warfare and entirely new methods were required to combat it successfully. Life was not so simple in those dark days of 1942 that one and only one method of combatting the U-boats could be immediately selected as the best—there were several, and *each* offered its good points; when by actual experience against enemy submarines it was determined what really was the best method, training, attack and defense were standardized. And, despite the wails of Colonel Stimson, the True Church of the Navy moved on to success in the duties assigned it in the Battle of the Atlantic.

In conclusion, we like this book and intend to read each one by Captain Morison that follows. From Argentina to Murmansk to Brazil he has told the story of the 'Battle of the Atlantic' in a manner to meet the critical approval, and merit the full confidence, of those who fought it and of those who would know of it.

COMMANDER NATHAN SARGENT, U. S. N. *Admiral Dewey and the Manila Campaign. With a Foreword by Fleet Admiral Ernest J. King, U. S. N., and an Introduction by Commodore Dudley W. Knox, U. S. N.* (Washington, D. C.: Naval Historical Foundation, 1947). Cloth, 7" x 10", xvi + 128 pages, illustrated, and with end paper charts. $3.00.

The Naval Historical Foundation is to be commended for preserving this interesting tribute to the memory of the victor of Manila Bay. With its considerable documentation and its pleasantly period spirit and prose style, it might well find a place on the shelves of any veteran of Bataan or Leyte Gulf, to remind him of the initial conquest of the Philippines, in a gentler, more civilized age when war was so very different from what it has since become.

The narrative was prepared in 1904 by Dewey's then aide 'from official records . . . and from personal memoranda and recollections of the Admiral and of the commanding and other officers who served with him'; its facts were certified by the Admiral 'to be as correct as is possible in any historical document,' and the Foundation is doubtless right in believing it to be about as near to an original source on the campaign as we are likely to get. It is not, however, any great contribution to history,

for the reason that nearly all of it was incorporated—without attribution but often with no more textual change than was necessary to convert it into the first person—in Dewey's *Autobiography,* published in 1913. Commander Sargent's paragraphs are already well embedded in histories of the period, quoted by writers who were unaware of their actual authorship.

Comparison rather amusingly reveals the way in which the Admiral tended to water down some of his aide's more heady rhetoric and diplomatically to soften the latter's acerbity on the subject of the provocations of the German squadron under von Diedrichs. But aside from one passage, purporting to give Dewey's actual words to von Diedrich's emissary ['Do you want war with us? . . . Well, it looks like it, and you are very near it; and you can have it, sir, as soon as you like'] the Sargent narrative adds virtually nothing to the established picture of that still somewhat mysterious episode—which is not surprising, since it now turns out that the picture rests so largely on the Sargent account.

It is useful, nevertheless, to have the original from which the Admiral ghosted, even if this revival of the Admiral's justified fame as an efficient naval commander unavoidably necessitates a reflection upon his reputation as autobiographer. It is useful, also, to have in one place not only the Sargent narrative but the documentation supplied in footnotes and appendices—texts of the important dispatches, text of the Spanish admiral's report upon the disaster, the *Diario de Manila's* account of the battle, published on 4 May 1898, texts of the correspondence over the embarrassing problem of Aguinaldo and his insurgents, and so on. Much of this material is available in the dustier recesses of our libraries—if one can find out where to look for it—but here it is conveniently arrayed. And the story—quaint and Kipling-flavored as it now seems—is important. Commodore Dewey arrived in Manila Bay only forty-four years after Commodore Perry had arrived off Yeddo, and only forty-seven years before U. S. S. *Missouri* returned to the ashes of Tokyo and Yokohama. There is no doubt that Dewey made history.

RANDALL V. MILLS, *Stern-Wheelers up Columbia; a century of steamboating in the Oregon Country* (Palo Alto, California: Pacific Books, 1947). 5¾″ x 9¼″, cloth. x + 212 pages. Frontispiece and chapter heading sketches by Jerry MacMullen, 37 illustrations, 4 maps, end paper maps, index. $3.75.

The history of water transportation in the Pacific Northwest has attracted the interest of a remarkable number of able scholars in the last three-quarters of a century. Much of their work has necessarily dealt with detailed aspects of the subject, and Randall V. Mills's *Stern-Wheelers up Columbia* summarizes this as far as the Columbia and its tributaries are concerned, as well as adding the results of fresh investigation of sources, and thoughtful interpretation of the relation of water transportation to the economic and social life of the region.

The author is Assistant Professor of English at the University of Oregon. His interest in western transportation is of long standing, and he has previously published significant contributions to that field, especially in railroad history. Although this is his first venture afloat in print, it is abundantly clear from the book that he knows his steamboats by his mastery of their lore and vocabulary.

Mr. Mills makes it plain at the outset that steamboats are his central theme. He includes the necessary minimum of corporate and political background, but focusses attention on the boats themselves: their appearance and character, the work they did, the men who manned them, and the hazards they encountered. The book shows a breadth of view which is striking in contrast with the last general book on the subject: *Lewis and Dryden's marine history of the Pacific Northwest* (1895). Mr. Mills is remarkably successful in depicting the interplay of river traffic with the growth of population, the expansion of agriculture, and the rise of competing methods of transportation.

A century of steamboating in the Oregon Country is the book's subtitle. Actually it is a bit more than that since it opens with the arrival of the Hudson's Bay Co. *Beaver* in the Columbia in 1836, and comes down to the appearance of the stern-wheel towboat *Portland* on the Willamette in 1947. Over this span of one hundred and eleven years, Mr. Mills deals with the extension of steam navigation up the Columbia, Snake, and Willamette, types of passenger and cargo traffic, hazards of operation, the surmounting of barrier rapids by portage railroads and canals, and the decline of river traffic. In packing a vast amount of information into comparatively little room, the author presents his material regionally, topically, and chronologically as the occasion demands. There is sound logic in his organization, but this is not always apparent to the reader as he proceeds through the book, and he sometimes wishes for more introductory and transitional passages or an analytical table of contents.

In addition to the text proper, there are appendices which list steamboats which have operated on the Columbia and its tributaries with statistical data about them, and which contain tables of distances on the Columbia, Snake, and Willamette. There are no footnotes, but the brief selected bibliography lists the outstanding printed works bearing on the subject which are available in major libraries. The fine selection of photographs of steamboats and the useful maps are especially worthy of mention. In its format, the book is unusually attractive, and is a credit to the taste and standards of its publisher, Pacific Books.

It is difficult to make lively reading of a narrative which is of necessity highly factual. Mr. Mills has succeeded in doing this, however. His style is breezy and colorful, fitting itself admirably to the subject. A wealth of yarns and anecdotes told with great narrative and descriptive ability make the book excellent from a literary viewpoint. There are a few slips, but on the whole the book gives evidence of careful and effective use of primary and secondary materials. It makes no claim to being a definitive study of the subject, but it is a sound and reliable piece of scholarship, and a significant contribution to the literature of American marine history.

HOWARD MCKINLEY CORNING, *Willamette Landings: Ghost Towns of the River* (Portland, Oregon: Binfords and Mor, 1947). 6″ x 8½″, cloth. 202 pages. $3.00.

Randall Mills, author of *Stern-wheelers up Columbia,* has told the story of the stern-wheelers on the Columbia and its tributary Willamette. Now Howard Corning tells the stories of the landings these vessels used on the Willamette and its tributaries. This book is a good supplement to Mills's work in that it supplies some information about the landings, their cargos and interesting sidelights on river life.

The lives of these river landings, their birth when the river was the best means of transportation and their death from many causes, are interesting. The influx of the railroads killed off the landing places as centers of transportation. These landings run from Linnton, now part of Portland, through Canemah, the portage city at the falls, to Eugene and Springfield, now both above navigation on the river. Among one of the more interesting places was Lancaster. Lancaster had the reputation of being a very rough settlement and its citizens caused much trouble with the stern-wheelers that stopped there. Finally, during the flood of 1861, the river moved about a mile east of the town and left its landing high and dry. Many of the smaller places had no actual docks but whenever a boat came to them, they drove out to it in a wagon.

CRITCHELL RIMINGTON, Editor, *The Sea Chest: A Yachtsman's Reader* (New York: W. W. Norton & Co., Inc., 1947). 5½" x 8½", cloth. 355 pages. $3.50.

The present managing editor of *Yachting* has winnowed from *The Sea Chest,* a little digest magazine he published before the late war, what he considers the best stories that were therein reprinted. Despite the fact that the material presented here is, therefore, at third hand, readers are bound to make the pleasurable discovery of stories which are new to them as well as finding old favorites, previously encountered in other dress. Although Mr. Rimington's selection for the contents of this book was achieved by personal preference alone, he affords a reasonably well balanced seagoing diet. Two useful articles by Ernest Ratsey cover the care of sails. Messrs. Henry Howard, G. W. Mixter, E. S. Clark, Jr., and Anthony Anable cite the arts of the navigator. Autobiographical deep-water cruising yachtsmen are represented among others by passages from 'Captains' Alfred Loomis, Richard Maury, Irving Johnson, Warwick Tompkins, Alan Villiers, J. C. Voss, A. C. Brown, T. F. Day, and Dennis Puleston, while C. G. Davis sums up the attainments of the single-handers. One of the most useful articles is 'The Strength of the Wind at Sea' by Gardner Emmons.—In all, a pleasant profitable little book.

PEABODY INSTITUTE, BALTIMORE, ED., *Warner and Hanna's Plan of the City and Environs of Baltimore . . . 1801* (Baltimore, Peabody Institute, 1947). Collotype reproduction of map, 19½" x 29". $5.00.

This handsome reproduction of an 1801 map of Baltimore, showing the wharves and waterfront of the period, has been made by the Meriden Gravure Company in collotype and colored by means of stencil washes. It is a most attractive map, with decorative as well as documentary value, and should prove of great interest to everyone who cares for the port and city of Baltimore.

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